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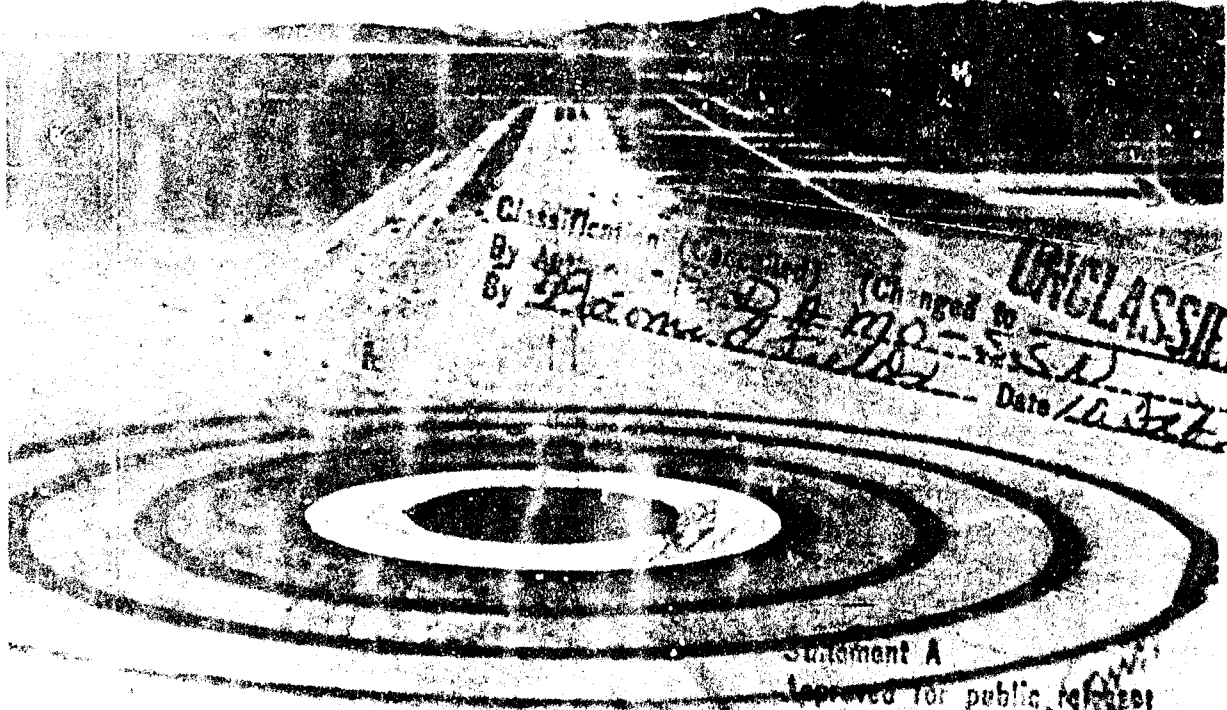
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GROUND ZERO

EXERCISE

NOT COUNTED

DESERT ROCK

IV

APRIL - JUNE 1952

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EXERCISE
DESERT ROCK IV
April - June 1952

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F O R E W O R D

This report on Exercise DESERT ROCK IV is submitted in compliance with par 2a(9), Letter, Headquarters Sixth Army, dated 19 March 1952, subject: "DESERT ROCK IV - Letter of Instruction No. 1."

The overall purpose of the report is to provide all branches of the Armed Forces with the latest information available from Exercise DESERT ROCK IV, for use in study and planning in connection with the possible employment of atomic weapons.

While the principal mission of the exercise was the indoctrination of troops and observers, attention was also given to blast and thermal effects on troop equipment, materiel, and emplacements under field conditions, and on live animals. Xbs.

Information contained in the report is factual, but results from a series of single detonations of atomic devices of differing KT yields, differing methods of delivery, and differing heights of burst. Since no two detonations covered in the report had identical background, results from each detonation must be considered separately, and caution must be exercised in generalizing from this report on possible effects at predetermined distances from ground zero.

H. P. Storke

H. P. STORKE
Brigadier General, USA
Exercise Desert

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TASK FORCE UNITS

Hq and Hq & Svc Co 369th Engineer Amphibious Support Regiment
(Augmented)
Shore Battalion 369th Engineer Amphibious Support Regiment
562d Transportation Staging Area Company
23d Transportation Truck Company
31st Transportation Truck Company
Company "A", 505th Military Police Battalion
Detachment, 314th Signal Construction Battalion
216th Chemical Service Company
Detachment, Army Air Section, Sixth Army
369th Army Band
Detachment, 504th Signal Base Maintenance Company

PARTICIPATING UNITS

2d Bn (-2 Co's) 504th Abn Inf Regt, 82d Airborne Division
Co "B", 167th Inf Regt, 31st Infantry Division
Co "C", 135th Inf Regt, 47th Infantry Division
Engineer Platoon, 369th Engr Amph Sup Regt
Medical Detachment, Sixth Army
Prov. Sq, 140th Fighter-Bomber Group
Prov. Sq, 187th Fighter-Bomber Sq
1st Prov Marine Battalion, Camp Pendleton, California
2d Prov Marine Battalion, Camp Lejeune, N. C.
Tank Platoon, 11th Armored Cavalry Regt
701st Armored Infantry Battalion, 1st Armored Division
Tank Platoon, 1st Armored Division
Engineer Platoon, 1st Armored Division
Medical Detachment, 1st Armored Division

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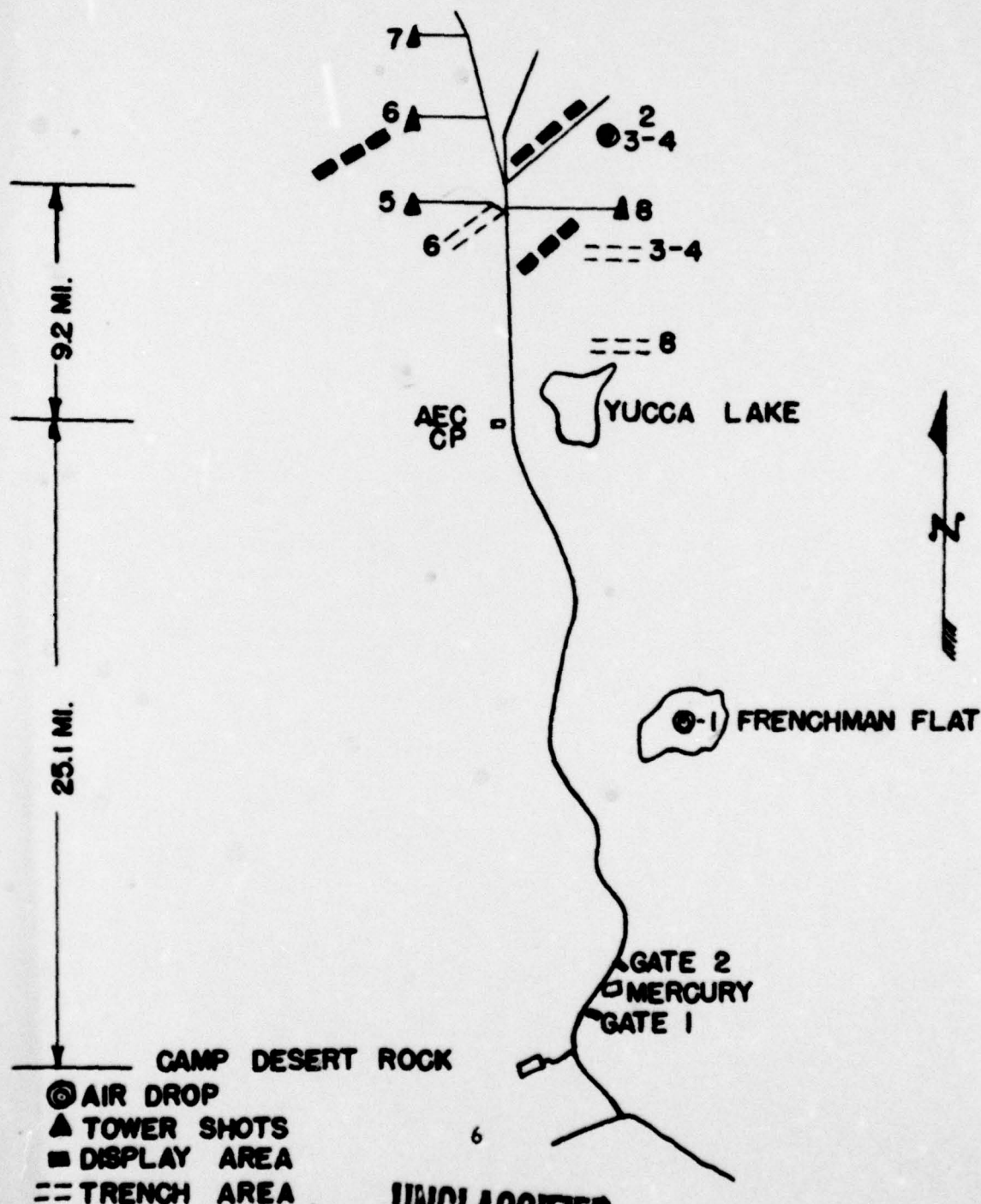
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RELATIVE LOCATION
OF
TOWER SHOTS and AIR DROPS



- AIR DROP
- ▲ TOWER SHOTS
- DISPLAY AREA
- TRENCH AREA

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REPORT
of
EXERCISE DESERT ROCK IV

I. INTRODUCTION

Exercise DESERT ROCK IV, the U.S. Army designation for its participation in AEC operations TUMBLER/SNAPPER, the fourth in a series of atomic device exercises, was held at the Nevada Test Site, 65 miles northwest of the City of Las Vegas, Nevada, during the months of April, May, and June 1952.

II. MISSION

1. The mission of Exercise DESERT ROCK IV was, with the maximum Army participation possible, to provide indoctrination training in tactical operations featuring tactical employment of atomic devices, to provide training in essential protective measures, to observe psychological effects of atomic explosions on individuals, and, in a lesser degree than in Exercises DESERT ROCK I, II, and III, to provide indoctrination training in the effects of atomic explosion on equipment, materiel, and emplacements. For index of directives from Department of the Army, Office of the Chief of Army Field Forces, and Sixth Army concerning the mission of Exercise DESERT ROCK IV, see Annex I.

2. In general, the mission of Exercise DESERT ROCK IV was a continuation of the missions of the previous three Exercises DESERT ROCK. In this exercise it was desirable that Army participation continue its progress, within reasonable bounds of peace-time safety requirements, toward the objective of actual close-in operation of Army troops in the face of atomic explosions, approximating as nearly as possible actual war-time conditions. In connection with this progress, several notable advances were made during Exercise DESERT ROCK IV.

a. Troops were positioned for bursts at 7000 yards from ground zero, which was nearer than any known personnel have ever been so exposed, excluding the Japanese at Hiroshima and Nagasaki.

b. Greater independent responsibility was given U.S. Army personnel in connection with radiological safety than had been given in previous tests.

c. Participating troops were permitted nearer ground zero following the bursts than ever before; i.e., for Shot Number 3, this distance was 175 yards.

d. U.S. Army participants in Shot Number 8 were permitted to take up a tactical advance toward their objective immediately following the explosion, without waiting for the official AEC declaration of R-Hour (radiological clearance to advance into the shot area).

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III. INDOCTRINATION

The missions of the Commanding General, Camp Desert Rock, as outlined above, were accomplished by the following means, for VIP observers, troop observers, and troop participants:

- a. Pre-shot indoctrination on basic atomic theory, results of past exercises, and operational plans for the forthcoming shot.
- b. Pre-shot explanatory visit to the Test Site.
- c. Observation of the shot.
- d. Post shot explanatory visit to display areas near ground zero.
- e. Post exercise seminar for introduction to and discussion of major questions concerning possible Army operational and administrative doctrine for the atomic age.

IV. PARTICIPATION

Troop participation in the four atomic explosions comprising Exercise DESERT ROCK IV was based on the concept that aggressor strong points had repulsed attempts by friendly units to force a breakthrough into enemy held territory. Decision was made to use the atomic weapon to clear the way for penetration into enemy rear areas and installations.

After protective positions had been prepared and occupied approximately 7000 yards from the assumed enemy front lines, the atomic device was air dropped on two positions and fired from towers, thus to a degree simulating artillery bursts, at two other positions.

Following the explosion of the first of the two airdropped atomic devices, an Airborne unit executed a parachute drop in the rear of the enemy position and linked up with other Airborne and Regular Infantry units which had advanced through the vicinity of ground zero to the link-up area.

The second of the two air drops saw the participation of two Marine BCT's under the same circumstances and plan, except that no airborne drop was involved.

The first atomic device detonated from a tower and involving troop participation, furnished background for an Armored BCT to move toward the effects display area near ground zero. This phase of the exercise was the first in which Army CBR monitors alone were permitted to monitor and give the all clear signal for advance into the contaminated area.

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Immediately after the firing of the second tower shot (simulated artillery burst), a BCT composed of Engineer Amphibious Support Troops (augmented) began a tactical march toward the explosion area without waiting for rad-safe clearance from the AEC or Army CBR monitors. Army Monitors advancing in front of this unit provided radiological safety. Tanks were used in the tactical movement to provide cover for troops on foot. Tank crews remained inside the tanks at 7000 yards from Ground zero during the explosion.

Throughout, individual participant observers were integrated with troop units, at the 7000 yard distance from ground zero, in indoctrination, and in witnessing the explosion. After the explosion the observers were moved to the equipment display area to witness blast and thermal damage effects on materiel, equipment, and emplacements.

V. PSYCHOLOGICAL REACTION

Psychological reaction research was conducted by two professional teams of psychologists in connection with selected troop units participating in Shots Number Three, Six, and Eight of the Atomic Energy's TUMBLER/SNAPPER series of detonations. For purposes of study and analysis, tests were conducted prior to an after orientation about the atomic device.

1. Human Resources Research Office proposed:

- a. To measure the general level of troop information about atomic energy and effects of the device.
- b. To measure troop attitudes toward the device and the maneuver.
- c. To assess men's emotional feelings about maneuver situation.
- d. To measure physiological reactions as indices of the men's emotional reactions.
- e. To estimate men's efficiency in the performance of a typical, individual soldier's task.

Procedures, methods, and equipment used in testing by the Human Resources Research Team were set forth in their preliminary report, but findings will be delayed due to time required for detailed study and analysis of results obtained.

(Distribution of the complete findings, when published, will be made by Human Resources Research Office to addressees receiving this report).

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2. Operations Research Office proposed:

- a. To collect and evaluate opinions of troops obtained on question schedules.
- b. To determine physical behavior of participants in the maneuver exercise.
- c. To evaluate achievement in performance tests.
- d. To evaluate physiological reactions to specific questions and statements about the atomic device.

Preliminary conclusions of Operations Research Office based on findings from Shot Number Three were:

- a. When troops have been thoroughly indoctrinated, they are able to perform a well-rehearsed atomic maneuver adequately.
- b. Evidences of emotional disturbances in prospective participants in an atomic device maneuver are more fully revealed through their physiological reactions than through their overt behavior.
- c. That in combat conditions where an atomic device may be used, well indoctrinated troops may be expected to perform in a satisfactory manner.

(Distribution of complete findings by Operations Research Office, when published, will be made to addressees receiving this report).

3. In addition to tests conducted by the above mentioned organizations, Staff Personnel of Camp Desert Rock conducted surveys through I and E discussion groups and small informal meetings, to obtain quick check on attitudes before and after orientation as well as on the effectiveness of the orientation program.

A survey of six companies of troops composed entirely of station complement personnel indicated the following:

- a. All troops were less fearful of the atomic device after indoctrination and witnessing of an atomic detonation.
- b. Only one company indicated a belief that troops working in atomic units should be volunteers. Two companies failed to produce personnel willing to volunteer for atomic duty if the opportunity presented itself.
- c. A large majority would be willing to move up to entrenchments at the two mile mark in demonstrations similar to those in Exercise DESERT ROCK IV.

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d. Fear of the after effects of radiation still transcends all other fears connected with the atomic device.

e. All groups indicated a desire for additional information on radiation effects.

VI. FISCAL

The original estimate of overall cost for the operation of Exercise DESERT ROCK IV was computed at \$466,425.00. This amount was deemed necessary to cover cost of movement of individual observers and participating troop units to Camp Desert Rock and return to home station, movement of impedimenta of participating troop units to and from Camp Desert Rock, and technical service requirements at Camp Desert Rock.

To cover the expense of the exercise, an allocation of \$450,000.00 was made from Special Field Exercise funds. The Department of Navy and Department of Air Force paid proportionate shares of technical service requirements.

(Detailed fiscal report (Annex IV) will be distributed only to interested headquarters, after receipt of all vouchers and claims connected with the exercise).

VII DAMAGE EFFECTS

Damage effects data contained in this report are neither based on scientific calculations, nor are they to be considered conclusive proof of possible future effects under similar conditions.

Since the primary mission of Exercise DESERT ROCK IV was orientation and indoctrination of troop units and individual observers, an effort was made throughout the exercise to use only items of equipment that might affect the tide of battle in a tactical situation and to emplace them in as natural a location as possible. Every effort was made to show, through actual demonstration on the ground, what would happen to normal military equipment when exposed at various distances from ground zero, and to various sizes and types of bursts used in the different phases of the exercise.

Damage effects worthy of note and which seemed to apply alike to Shots Three, Six, and Eight include:

1. Lethal effects of gamma radiation on sheep in foxholes up to 550 yards from ground zero, and lethal effects of gamma radiation on sheep above ground surface up to 900 yards from ground zero.

2. Severe blast damage on surface of ground up to 1700 yards from ground zero. Blast destruction effect falls off rapidly beyond the 1700 yard mark.

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3. Fires ignited in desert vegetation by thermal radiation beyond 3500 yards from ground zero by each shot.

In using the damage effects data contained in Annex IV, it should be kept in mind that only one of the tests, Shot Number Four, conducted during the entire exercise employed a regular tactical weapon detonated at an optimum height. However, in order to gain the maximum benefit from other tests, typical demonstration areas were set up for each shot to give added realism to the orientation and indoctrination of troop units and individual observers.

VIII. RECOMMENDATIONS

a. That a senior officer with appropriate staff be designated by Department of the Army and/or Army Field Forces for the overall coordination of future Army participation in atomic exercises, and for conduct of continuing liaison with appropriate agencies such as AEC and AFSWP.

b. That in future, an exercise director be appointed sufficiently far ahead of each atomic exercise to allow him to participate in the initial planning stages of the operation when conducted on Department of the Army and/or Army Field Forces level.

c. That future exercise directors be briefed in advance on programs intended by AFSWP for experimentation during atomic exercises.

d. That during the advance planning on Department of the Army and Army Field Forces level, technical services of the Department of the Army be fully apprised of the intended plans, to the end that each service may plan to take advantage of each individual atomic exercise for the testing of such technical equipment as it may desire. In order to prevent any possible confusion of display items in the display areas, this planning obviously must be thoroughly coordinated with the exercise director from the start of the basic planning period.

e. That psychological and physiological agencies of the Department of the Army, i.e., Human Resources Research Office and Operations Research Office, be also informed of the general plan for each exercise well in advance of the actual dates of participation in order that they may organize more completely their research planning on these subjects.

f. That quotas for troop observers and troop participation be continued on the same basis as for Exercise DESERT ROCK IV, to wit: for each individual atomic explosion, 500 observers and 1500 to 2000 troops.

g. That troop participation in future exercises be on a basis of as much participation from diversified units from all sections of the country as possible. It is visualized here that participating combat

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teams or task forces should be composed of as many small units of the size of companies or platoons as possible, in order that the experience and indoctrination gained in each exercise be given the greatest possible dissemination among troops in the Continental United States.

h. That on a progressive basis, with the object of disseminating important essential atomic information to them, civilian defense agencies be given a quota for representation at all future exercises.

i. That the course of indoctrination and instruction at Camp Desert Rock be thoroughly organized sufficiently in advance of future exercises, as follows:

(1) A highly competent instructor staff of at least five officers be designated for this duty and assigned for a continuous period of at least one year. This staff should be composed only of the most highly qualified Army officers or Armed Services officers, whether these officers, during the period of their assignments as instructors, are on detail with AFSWP or are on their normal service duties.

(2) That observers on TDY at Camp Desert Rock be organized in two categories:

(a) Officers or enlisted men who have had previous organized atomic instruction or indoctrination, i.e., as at Sandia, to report for one full day of review and indoctrination prior to the shot which they are sent to witness.

(b) Other observers who have had no previous indoctrination to report three days before each shot, in order that they may be given essential basic indoctrination on atomic theory, on the details of shot participation, and related subjects.

(3) That the course of instruction and indoctrination at Camp Desert Rock be officially recognized, in order that each participant receive full credit on his records for his participation, on the same basis as that given for attendance at Sandia.

(4) For other specific recommendations in connection with orientation and indoctrination, see Annex I.

j. That in conjunction with troop-observer indoctrination there be conducted at Camp Desert Rock the U.S. Army radiological safety monitoring school. This school must be on a larger scope than has heretofore been attempted, in order that the principles of radiological safety monitoring instruction be given as widespread dissemination among troops as possible. For other specific recommendations in connection with Radiological Safety, see Annex I.

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k. That the exercise director be hereafter assigned, for each atomic shot, a sector of between 90 and 180 degrees on a radius from ground zero to any desired distance, so that troops participating would have free access of troop maneuver, without restrictions on their movements imposed by AEC or AFSWP blast lines, instrumentation, communication lines, or similar hindrances.

l. That the Department of the Army be given by AEC the responsibility for the planning and implementation of its own radiological safety plans in future exercises, subject to prior general policy decisions between AEC and Department of the Army in Washington.

m. That the radiation dosage limit for Armed Forces participation in future exercises be raised from the present three (3) roentgen limit. In view of the fact that this troop participation will invariably be for a brief period of time, it is believed that the dosage which the troops may safely take can be raised materially above the present level of three (3) roentgens. Although this level is doubtless a reasonably one for continuing exposure by AEC and AFSWP personnel over long periods of time, it is believed that it is too low for personnel such as troops who will not be exposed for long periods, and that its continuance will unduly hamper military experimentation.

n. That the distance of 7000 yards between ground zero and entrenched front line positions of Army (Armed Forces) troop observers and participants be decreased as follows, for atomic shots from towers or other static locations:

- (1) That the main entrenching distance to witness explosions of atomic devices of an expected yield of 30 to 35 KT be 5000 yards.
- (2) That for an expected yield of 25 to 30 KT be 4600 yards.
- (3) That for an expected yield of 20 to 25 KT be 4200 yards.
- (4) That for an expected yield of 15 to 20 KT be 3800 yards.
- (5) That for an expected yield of 10 to 15 KT be 3500 yards.
- (6) That for an expected yield of 5 to 10 KT be 3200 yards.
- (7) That for an expected yield of 5 KT or less be 3000 yards.

For devices dropped from airplanes, each front line location should be evaluated separately, on the general basis of the above figures, commensurate with the probable error of drop from the aircraft.

It must be emphasized that the distances specified above are recommended solely from the point of view of estimated safety during peace-time

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indoctrination and that no implication concerning tactical doctrine is intended.

o. That the use of volunteers for specific tests, possibly closer in than the distances specified in subparagraph n above, be authorized in general by agreement between AEC and Department of the Army in Washington, and be subject to specific conditions agreed to at the Nevada Test Site in each case between AEC officials and the exercise director. These conditions should include agreement on the need for the data which such volunteer missions could produce, the specialized training to be given to these volunteers, consideration of possible adverse conditions such as wind conditions or error of drop for each case, and the overall control of these volunteers for their rapid evacuation in case dangerous exposure seemed evident.

p. That a small, lightweight, and efficient radiac indicator-counter be provided in lieu of the present bulky and heavy counters, for use by troop radiological safety monitors in the future. A lightweight device of the type needed is already under experimentation and development by AFSMP.

q. That future indoctrination in, test firing of, and experimentation with, atomic artillery and atomic guided missiles be conducted at the Nevada Test Site, or at a possible adjacent extension of the Site, under the exercise director, Camp Desert Rock.

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2	The Med Field Svc School		Armed Forces
2	The Ord School	2	Armed Forces Staff College
2	The Psy Warfare School	2	Nat'l War College
2	The QM School	2	Jt Abn Troop Bd, Ft Bragg, N.C.
2	The Sig School	2	Jt Abn Trans Bd, Ft Bragg, N.C.
2	The Trans School	2	Jt Landing Force Bd, Norfolk, Va
2	The FMG School	2	Jt Amph Bd, Little Creek, Va
2	The AG School	2	Jt Air Def Bd, Norfolk, Va
2	The Army Fin School	2	Jt Tac Air Support Bd, Ft Bragg
2	The Chaplain School	2	BRL, Aberdeen Proving Ground
2	USAF Air-Grp Opns School	2	CG, Camp Desert Rock
2	Air University		

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CAMP DESERT ROCK IN BACKGROUND

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ON
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16B

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Maj. D. E. Keiffer, S3, Maj. A. M. Ciccone, S4, LtCol A. S.
Sadove, S1

Front Row: LtCol U.W. Boresch, Exec for Admin, Col S.E. Whitesides, Chemical
Officer, Brig Gen H.P. Storke, Exercise Director, Col George
Spaur, Chief of Staff, Maj G.A. Smith, Exec for Operations.

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ANNEX I - ADMINISTRATION

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The mission of the Exercise Director of Exercise DESERT ROCK IV was specified in the following communications:

- a. Message, G3, Department of the Army, DA903422, dated 13 March 1952.
- b. Letter, OCAFF, ATNG-43 354/115 (C)(19 Mar 52) dated 19 March 1952, subject: "DESERT ROCK IV."
- c. Letter OCAFF, ATNG-43 354/126 (C)(4 Apr 52) dated 4 April 1952, subject: "Directive for Exercise DESERT ROCK IV."
- d. Letter, Hq Sixth Army, AMGCT-4 354.2 dated 19 March 1952, subject: "DESERT ROCK IV, Letter of Instruction No. 1." ✓
- e. Letter, Hq Sixth Army, AMGBI-CI 354.2 dated 2 April 1952, subject: "DESERT ROCK IV, Letter of Instruction No. 2."

Initial administration planning for Exercise DESERT ROCK IV was accomplished by the Sixth Army Staff. However, all later planning was carried on by personnel assigned to TDY at Camp Desert Rock.

The Camp Desert Rock Station Complement was organized on a standard staff basis with an S1, S2, S3, S4, and the normal special staff officers.

The additional special staff sections were added to the station complement in order to provide services not ordinarily performed by the regular staff. These sections were designated as the "Instructor Group" and "Radiological Safety Group." Their histories and functions follow:

a. Instructor Group

(1) The instructor group at Camp Desert Rock was organized during the first week in April 1952 for the purpose of indoctrinating VIP's, observer personnel, participating troop personnel, and Camp Desert Rock personnel. The initially assigned instructor personnel arrived at Camp Desert Rock immediately prior to the first indoctrination course. This group consisted of five officer instructors, one operations sergeant, one stenographer, and a classroom assistant.

Because of the limited backgrounds of several of the instructor personnel, the initial course, from 19 April to 23 April 1952, was not conducted at the desired high standard. Upon completion of the course, prompt steps were taken to obtain suitable replacements.

The second indoctrination course was held from 26 April to 1 May 1952, for Marine and Navy personnel. The replacement instructors not yet being available, this course was conducted by the

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original instructors. Although their performance was considerably improved, it still fell short in quality.

For the third indoctrination course, the replacement instructors from AFSWP, were utilized; this course was well conducted throughout, in spite of the fact that the course was unavoidably extended from 12 May through 24 May. This was due to continuous delays caused by weather and mechanical failure in detonating the atomic device. As a result of this long delay, it became necessary for the instructor group to supplement the regular course of instruction several times. Additional instruction was provided by atomic specialists borrowed from AFSWP and by additional visual aids furnished by AEC.

The fourth and last indoctrination course was satisfactorily completed with the witnessing of Shot Number Eight on 1 June 1952.

(2) Problems encountered by the instructor group in formulating the course of instruction were:

(a) Inadequate reference material and training aids available at Camp Desert Rock.

(b) The initial assignment of inexperienced instructor personnel unqualified in both background and technique.

(c) Instructors were not organized in a group far enough in advance of the first phase of instruction to insure proper coordination in the preparation of subject schedules and lesson plans.

(3) Recommendation of the Instructor Group:

(a) That a directive be prepared at higher level stating the purpose, time length, and scope of the course.

(b) A highly competent instructor staff of at least five officers be designated for this duty and assigned for a continuous period of at least one year. This staff should be composed only of the most highly qualified Army officers or Armed Services officers, whether these officers, during the period of their assignments as instructors, are on detail with AFSWP or are on their normal service duties.

(c) That the instructor group have an additional eight hours instruction material available in case of unexpected delay in detonating the atomic device.

(d) That an additional training auditorium of Butler Type construction be erected prior to the beginning of future operations at Camp Desert Rock, to provide space for simultaneous instruction in different subjects.

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SCHEDULE

INDOCTRINATION SCHEDULE FOR OBSERVERS (OFF)

TIME	PLACE	SUBJECT	INSTRUCTOR
<u>MONDAY</u>			
1030-1040	Theater	Introduction	Brig Gen Storke
1040-1050	"	Security	CIC
1050-1100	"	Administration	Maj McKelvey
1110-1200	Bldg T192	What is an Atom Bomb	Lt Kinne ✓
1330-1420	Bldg T192	Military damage and effects	Lt Kinne ✓
1430-1520	" "	" " " "(Cont'd)	Maj Daddazio ✓
1530-1620	" "	Medical Aspects	Capt Cavedo
1630-1720	" "	Tactical Employment of a Wpns	Maj Daddazio
<u>TUESDAY</u>			
0830-0920	Bldg T192	Radiological Safety	Maj Henry
0930-1020	" "	Desert Rock I, II, III, & IV	Maj G. Smith
1030-1120	" "	Buster-Jangle Film	Maj G. Smith
1130-1220	" "	Seminar Orientation, Question & Answer	Maj G. Smith
1330-1730	Area	Free time for seminar Conferences	Group Leaders
<u>WEDNESDAY</u>			
	Fwd Area	Field Trip and Orientation	All
<u>THURSDAY</u>			
0830-1220	Bldg T192	Seminar Report	All
1330-1730	Bldg T192	Training Films	As Needed

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b. Radiological Safety Group

(1) Radiological Safety regulations were established by letter, Headquarters Test Command, AFSWP, Rad-Safe Group, Mercury, Nevada, dated 24 March 1952, subject: "Radiological Safety Regulations."

(a) All operations in the forward area were strictly governed by the limits established by Rad-Safe Regulations, Test Command, AFSWP.

(b) Maximum permissible dosage for the entire exercise was established at three (3) roentgens.

(c) Decontamination regulations prescribed limits for personnel and equipment.

(d) Dosage record was maintained by film badges processed by Test Command, AFSWP.

(2) In order to meet the above requirements, rad-safety operations at Camp Desert Rock included:

(a) Issuance of film badges to all personnel moving into the forward area on "Shot Day," and to other personnel whose duties required their presence in the area. Processed film badges were turned in to AFSWP, and the dosage record was forwarded by the Camp Desert Rock Surgeon to the individuals permanent station.

(b) Furnishing of advance monitors to survey entire routes of approach to and through contaminated areas, for observer groups on "Shot Day," and individuals or work parties on other days.

(c) Monitoring of all personnel on return from contaminated areas, and decontaminating all persons who caused a reading on the Geiger Counter. Decontamination of persons was effected by brushing dust off of clothes, and bathing of the body with soap and water. Vehicles showing a reading of 2 MR were decontaminated by washing with water.

(3) Recommendations:

(a) That a Chemical Service Company be assigned to Camp Desert Rock for all future exercises in order to provide adequately trained monitor and decontamination personnel.

(b) That a Radiological Defense Engineer, MOS 7330, be assigned in all future exercises to give technical advice to the exercise director and his staff.

(c) That Beckman Model MX-5 counters be used in future exercises to monitor personnel and vehicles, due to the inadequacy of the

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AN/PDR-27-A, Geiger Mueller Counter. Recommend one hundred instruments be made available for any future exercise comparable to DESERT ROCK IV. Also, recommend one hundred AN/PDR-T1B counters be made available at Camp Desert Rock for survey operations.

(d) That two alpha counters, and one hundred dosimeters, range 1-5 roentgens, be made available at Camp Desert Rock during future exercises.

(e) That Camp Desert Rock be provided a Signal unit for future operations capable of:

1 Maintaining and calibrating all radiac instruments mentioned above.

2 Processing by photo dosimetry all film badges used by personnel in contaminated areas.

(f) Facilities for decontamination be provided to include six power driven decontamination apparatus. Apparatus to be operated by members of the Chemical Service Company assigned.

(g) That the following items of issue be provided Camp Desert Rock for protection and radiological decontamination in future exercises:

- 1200 Fatigue suits - tare sizes
- 1200 Pairs of combat boots - tare sizes
- 2000 Gas masks
- 600 Gas mask canisters
- 400 Brooms
- 400 Brushes

(h) That the following personnel be provided for future exercises at Camp Desert Rock:

1 ea Cml Off (Chief of Section)	Col
1 ea Cml Off (Rad-Safe Engr)	LtCol
2 ea Cml Off (Chief Monitors)	Maj
1 ea Cml Off (Asst Rad-Safe Engr)	
1 ea Cml Off (Decon station)	
2 ea Cml Off (VIP Monitors)	
1 ea Cml Off (Property Off)	
1 ea Cml NCO (Chief Clerk)	
3 ea Cml NCO (Clerk-Store Records)	
1 ea company, Cml Service under T/O&E 3-500.	

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"CONDITION BLACK"

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ANNEX II - PARTICIPATION AND OPERATIONS

United States Army troop units and individual observer participants received orientation in exercises connected with Shots Three, Six, and Eight of the Atomic Energy Commissions Operation TUMBLER/SNAPPER.

Marine Corps troop units and Marine and Navy individual observer participants received orientation in an exercise connected with Shot Number Four.

SHOT NUMBER THREE

Army troop and observer operations began in connection with Shot Number Three at 0454 hours, 22 April 1952, when the Forward Control Group passed the initial point and began movement to the entrenchment area of the Nevada Test Site. The balance of the six serials in the 182 vehicle convoy moved on a time schedule which permitted the last vehicle to arrive at its designated area at 0816 hours.

The period from 0816 to 0920 hours was used for final on-site briefing over a very extensive public address system (Photo page 25).

The briefing included historical information about the test site and previous exercises, wind direction and velocity, description of the device carrying plane with its altitude at time of the drop, height of the device at time of explosion, practice in use of the gas mask in case of "Condition Black," (Photo page 26), details of the emergency evacuation plan, safety precautions and action to be taken just prior to the explosion, position to be assumed in foxholes and trenches, how rad-safe monitors check for gamma radiation by use of the Geiger Counter, (Photo page 27), other rad-safe information relative to H-Hour, when to look at the fire-ball, and post-explosion movements. The briefing concluded with information that H-Hour (time of explosion) would be 0930.

0920 hours all troop units and individual participants were ordered into foxholes and trenches.

0925 hours the Atomic Energy Commission Control Station took over the public address system and gave instructions to stand-by for the time signals.

0928 hours the Exercise Director ordered all participants to kneel, cover faces with hands, and lean against the forward wall of trenches and foxholes (Photo page 28).

0929 hours plus thirty seconds, the AEC Control Station stated "Bomb Away," following with a time count - fifteen seconds - ten seconds - five seconds - four - three - two - one - NOW.

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At exactly 0930 hours an extremely bright light was visible through closed and covered eyelids. Heat more noticeable than direct sunlight burned all exposed parts of the body for approximately two seconds.

H-Hour plus three seconds the command was given to raise and look at the fire-ball. Approximately fifteen seconds later the blast accompanied by dust, particles of grass, and leaves reached and engulfed the entrenchment area, momentarily blotting out the view of the atomic cloud.

0952 hours dust in the vicinity of ground zero appeared to be lifting. Rad-safe readings in the entrenchment area indicated a negative gamma ray reading.

0955 hours Army CBR monitors moved toward ground zero to sample test the explosion area.

1026 hours CBR monitors informed the Exercise Director that it was safe for all personnel to advance into the area of ground zero.

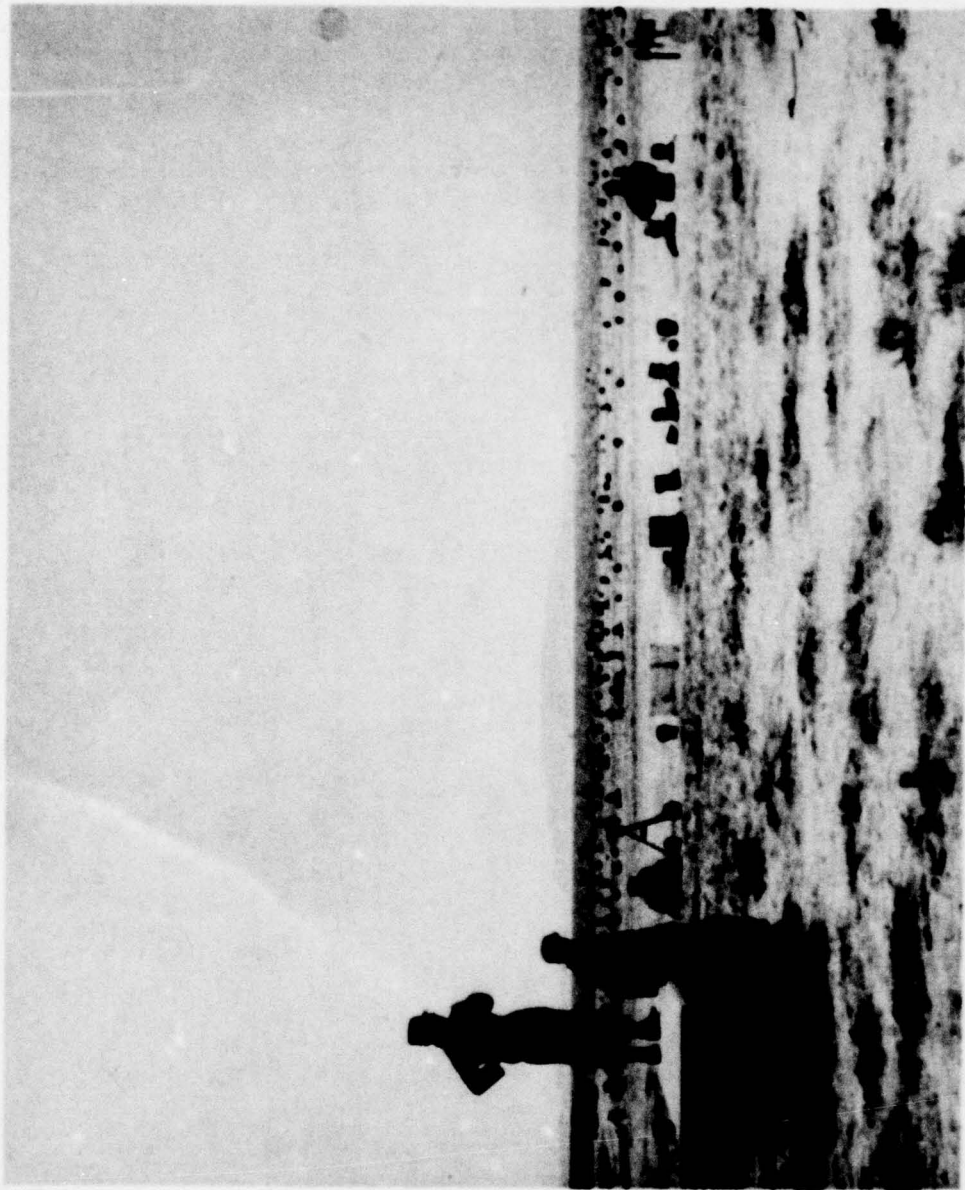
1029 hours the Exercise Director ordered the Airborne Infantry Jump Company to execute its mission by parachuting into the Zebra drop zone at 1115.

1030 hours all participants were ordered to entruck and move to the materiel display area in the vicinity of ground zero to witness blast and thermal damage effects.

(For typical operation order, see Operation Order 8 of this Annex).

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"ORIENTATION"

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"FITTING GAS MASKS"

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"WAITING FOR DETONATION"

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SECURITY INFORMATION

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SHOT NUMBER FOUR

With the exception of Army Control Group personnel, all participants in this phase of Exercise DESERT ROCK IV were furnished by Marine Corps and Naval units. One Marine Corps BCT was brought from Camp Lejeune, N. C., and another from Camp Pendleton, Calif. The two BCT's with individual observers from the Navy and Marine Corps were formed into a provisional unit for tactical operations at the Nevada Test Site.

Operations in connection with the Atomic explosion began at 0501 hours on 1 May 1952 and followed the same general procedure as prescribed for participation in Shot Number Three.

Tactical participation was conducted from trenches and foxholes previously prepared for and occupied by the Army BCT. The distance of the tactical positions from ground zero for both phases was 7000 yards.

Other similarities to participation in Shot Number Three included such items as dropping of the atomic device from an Air Force bomber, use of the same ground zero or target, selection of the same hour for detonation of the device, and use of the same general area for display of test equipment.

Differences in participation from that conducted by the Army BCT included the use of two BCT's instead of one, no parachute drop of Airborne troops, use of a different type atomic device of lesser yield, dropping the device from a B-45 bomber instead of a B-50, and detonation of the device at an altitude of approximately 1050 feet instead of approximately 3500 feet.

After the detonation and a simulated attack toward ground zero all Marine and Navy participants entrucked for an inspection trip to the materiel damage display area.

CBR monitors for this phase of the exercise were trained by and furnished from Marine Corps personnel.

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SHOT NUMBER SIX

Troop unit and individual observer orientation for participation in Shot Number Six was conducted for the 701st Armored Infantry Battalion and approximately five hundred individual observers from all major Continental and some overseas commands.

Due to repeated delays caused by weather and technical troubles, individual observers were given an unusually large amount of indoctrination by means of training films and lectures. Specialists in the atomic field were furnished by the Armed Forces Special Weapons Project Test Command, Camp Mercury, Nevada to assist with the additional indoctrination.

Original plans called for troop units to be provided by Camp Desert Rock Station Complement personnel. However, due to the delay of the detonation, and the arrival of the 701st AIB, a last minute change was made to permit the 701st AIB to witness Shot Number Six and to return to home station before the date for Shot Number Eight.

An unusual feature of this phase of the exercise was the conducting of psychological sweat test experiments with selected troop units in the entrenchment area at fifteen minutes and three minutes before H-Hour (time of explosion) at 0500.

Tactical maneuver was not planned for this particular phase of the exercise due to the nature of troop units originally designated to witness the blast. However, all troop units and individual observers did occupy protective foxholes and trenches 7000 yards from ground zero during the detonation. After the explosion these same units and individuals moved forward to witness the damage effects display.

A new progressive step after the explosion was the monitoring of the route of approach of the damage effects display area by Army CBR monitors without AEC supervision.

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SHOT NUMBER EIGHT

A completely new phase of tactical atomic maneuver was inaugurated by Camp Desert Rock station complement personnel in Shot Number Eight. From their entrenchment area 7000 yards from the detonation, troops jumped off in attack toward ground zero immediately following the arrival of the blast wave at the entrenchment area. This maneuver was lead by five tanks, whose crews had remained in the tanks during the detonation. Approximately four hundred and fifty individual military observers witnessed the blast and the movement of troop units from their entrenchments toward ground zero.

The Radiological Safety of military personnel, during Shot Number Eight, was delegated completely to the Army. This delegation by AEC represents a major step toward military independence in atomic maneuvers.

At shot time, 0455, the weather was extremely favorable for an attack toward ground zero from the south. Surface, as well as upper, winds were blowing away from the location of the participating troops. The post-shot maneuver therefore amounted to an attack from an upwind position toward ground zero. Army CBR monitors moved forward ahead of and also with the attacking troops. Because of the favorable winds this movement forward reached a point approximately five hundred yards from ground zero before radiation intensities (500 MR, as per agreement with Test Manager, AEC) made lateral movement necessary.

Favorable winds continuing, participating troops and troop observers were able to move, either by foot or motor, through all the display areas without delay. However, it must be strongly emphasized here that, if the positions of the troops and observers had been downwind from the shot, the extremely low tolerances of radiation dosage allowed might have prevented or abnormally channelized any forward movement or maneuver, and would doubtless have restricted the deep penetration toward ground zero which the troops actually accomplished. Also "CONDITION BLACK" might have forced all troop units to immediately evacuate the area, since a CBR reading of over 30 roentgens per hour existed at a distance of over 12,500 yards north of ground zero within an hour after the blast. (See Annex V for graphic illustration of the contaminated area).

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Hq Camp Desert Rock
Las Vegas, Nevada
261000U May 1952

OPERATION ORDER # 8 Exercise DESERT ROCK IV How

Task Orgn: Commanding General	- Brig General H. P. Storke
Control Group Commander	- Major G. A. Smith
369 EASR (-Boat Battalion)	- Lt. Col. W. H. Fairchild
Hq, Hq & Svc Co	- 1st Lt. L. C. Weygand
Hq & Hq Co Shore Bn	- Maj W. W. Wallingford
D Company	- Capt P. Flaherty
E Company	- Capt J. C. Reaves
F Company	- Capt W. G. Beer
31st Trans Trk Co	- Capt G. Makin
Tank Platoon	- 1st Lt H. A. Sackman
Observer Group Commander	- Maj G. M. McKelvey

1. a. See Current Intelligence Estimates and Summaries.
b. Tactical Situation: Hq Camp Desert Rock, 26 May 1952, See Annex 1.
c. Atomic Energy Commission detonates Tumbler Snapper #8 Nuclear Explosion, H-Day H-Hour, during which approximately 2100 US Army Troops, Army Troop Observers and Speical Observers will participate.
2. a. Headquarters, Camp Desert Rock will conduct Exercise Desert Rock IV How on H-Day, H-Hour, at the Atomic Energy Commission Proving Grounds to:
 - (1) Provide indoctrination training in the tactical employment of the Atomic Weapons.
 - (2) Provide realistic training for tactically disposed units when supported by Atomic Weapons.
 - (3) Provide realistic training in essential protective measures.
 - (4) Determine phsychological reaction of participating troops.
 - (5) Exhibit in general to determine, insofar as possible, the effects of the explosion on many types of ground force equipment at varying distances from ground zero.
- b. H-Day and H-Hour to be announced.
3. a. Commanding General and Party
 - (1) Moves in accordance with March Table (Annex 2).

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(2) Directs the Exercise in accordance with Annexes 1 through 9.

b. Control Group.

(1) Consists of personnel and vehicles as directed in Annex 3.

(2) Moves in accordance with March Table (Annex 2).

(3) Provides a commentary of events over PA system at entrenchment area from H-1 hour to R-hour.

(4) Implements provisions of Annexes 1, 5, 6, 7, 8, and 9.

(5) Participates in Exercise in accordance with Annex 4.

c. Observer Group.

(1) Consists of personnel and vehicles as directed in Annex 3.

(2) Moves in accordance with March Table (Annex 2).

(3) Participation in the Exercise in accordance with Annex 4.

d. 369th EASR (-)

(1) Familiarize all personnel with the general and special situations and special exercise maneuver. (Annex 1).

(2) Moves to entrenchment area, in accordance with March Table (Annex 2), occupy previously prepared defensive positions. Attack at H+2 minutes to seize and secure primary or alternate Objective Green in zone as directed. (See Annex 1). Prepared to continue forward movement on order.

(3) Participates in the Exercise in accordance with Annexes 1 through 9.

x. All personnel involved.

(1) Muster will be held in accordance with Camp Desert Rock regulations and as directed in Schedule of Events (Annex 4).

(2) All personnel will be familiar with provisions of Rad-Safe program (Annex 7). Gas Masks and film badges will be carried by each individual.

(3) All personnel will be familiar with provisions of evacuation plan (Annex 9).

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(4) All personnel will be informed that two (2) minutes prior to H-Hour a 30 second siren signal will be sounded, at which time participants will crouch in their entrenchments well below the surface of the ground and remain in the position until the announcement to raise is made over PA system.

(5) Movement of personnel and vehicles north of Objective Green will be on order only.

(6) Positive control measures will be enforced by officers in charge of vehicles and March Serials during movements by motor convoy. During foot marches, the same control will be exercised by Unit Commanders and by officers in charge of groups.

(7) All personnel will be cautioned not to pick up any items in the equipment display area, or in the vicinity of ground zero.

4. a. Current Administration instructions apply.

b. Transportation.

(1) Vehicles as required will be furnished by Camp S4 in accordance with Camp Desert Rock regulations

(2) Vehicles will bear numbers and signs as indicated in Annex 3.

(3) One 400 gallon water trailer will be included at the end of Major March Serial.

c. Medical - See Annex 8.

(1) Aid Station will be established in the vicinity of Parking Area M.

d. Uniform.

(1) Individual participants and non-tactical troops: Fatigues, combat boots, cotton OD cap, field jacket, if necessary, pistol belt and canteen w/water.

(2) Tactical Troops: Fatigues, combat boots, steel helmet, field jacket, if necessary, web belt and canteen w/water. Cotton OD cap will be worn under the helmet liner.

e. Unit Commanders will have two sandwiches prepared for each participant: One for distribution at the entrenchment area and one at Parking Area O, for distribution as close to noon as possible. Troops will not be fed in contaminated areas.

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5. a. Signal Operation Instruction Annex 6.

b. Forward CP Camp Desert Rock opens H-60 minutes at the entrenchment area Control Point.

STORKE
Brig Gen

ANNEXES:

- | | |
|---|--------------------------------------|
| 1. Tactical Situation | |
| 2. March Tables | |
| 3. Personnel and Vehicles (to be published later) | |
| 4. Schedule of events. | |
| 5. Military Police | This Order (OPN 8, Hq Cp Desert Rock |
| 6. Signal | 261000U May 1952), with all Annexes |
| 7. Rad-Safe | and Appendices thereto, may be down- |
| 8. Medical | graded to "RESTRICTED" 2400 Hrs How |
| 9. Evacuation Plan | Day. |

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Hq Camp Desert Rock
Las Vegas, Nevada
261000U May 1952

ANNEX 1 (Tactical Situation) to Operation Order 8,
Exercise DESERT ROCK IV How

1. General Situation

a. Enemy

(1) During the period July-August 1951 a strong Aggressor Force estimated at two Armies, consisting of four Corps each, landed in the Pacific Northwest and launched an offensive to conquer the United States. Their apparent plan of battle is to first secure the west coast area before continuing the attacks east.

(2) Aggressor activity to date has followed a typical pattern consisting of an attack phase, a defensive and buildup phase, followed by another attack phase. Attacks employ masses of troops in column that press and attack regardless of losses. During the defensive and buildup periods the enemy is well dispersed in depth. Movement and camouflage discipline are superior. Supplies and troops are moved at night due to U.S. Air superiority.

(3) By 5 May, in III Corps zone, Aggressor had reached a general line, Indian Springs west along Highway 95 to vicinity Beatty, Nevada, at which point an attack phase of his operation was halted. By 27 May U.S. counterattacks had pushed the Aggressor back to the general line Quartz Springs 740/570, west across the south end of Yucca Flats 700/570, Tippipah Springs 680/580, and west to Beatty, Nevada. Intelligence information indicates that Aggressor is prepared to make another mass attack to seize Hoover Dam and the Las Vegas road and communications center.

b. Friendly

(1) During the 1951 campaign, U.S. forces fought delaying actions only. By early May 1952, sufficient force has been mastered to begin a counterattack in strength, to destroy the Aggressor Force.

(2) The U.S. Sixth Army, composed of the III, XII, and XV Corps, has conducted operations since 1 May, designed to goad the Aggressor into conducting an all out mass attack and get his main force into the open. When determined that Aggressor has committed himself, atomic weapons will be used to destroy the bulk of his force and a full scale counterattack will be initiated to carry the battle on to the north.

2. Special Situation

a. III Corps, composed of the 31st, 47th, and 44th Infantry Divisions on line and the 1st Armored Division in reserve (See Appendix A - Situations Overlay) is now engaged with the enemy in the Yucca Flats area.

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b. Over the past 72 hours the Aggressor has put up very stubborn resistance and begun strong probing attacks, in force, to feel out the deployment of troops. Intelligence sources are positive that he will begin an all out attack on the morning of 29 or 30 May 52. A Battery of 280-mm guns, with three atomic projectiles per gun, has been brought up and will be employed when Aggressor has committed his force and is in the open. Narrow sectors have been assigned Divisions to channel the attack across Yucca Flats Proper.

3. General Plan of Maneuver

a. III Corps conducts a general offensive on H-Day at H-Hour. The attack to be preceded by a shelling of the Aggressor force with atomic projectiles on Corps Order.

(1) 31st and 44th Infantry Division: Attack H-Day H-Hour to seize "Objective Black," destroying Aggressor force in Zone. Prepare to continue the attack to the north on order.

(2) 1st Armored Division: In rendezvous on the south end of Frenchman Flat, move to the north end of Frenchman Flat, just south of Yucca Pass at H-12 hours, occupy position in Yucca Flats in Zone by H-Hour H-Day. At H-Hour H-Day, attack and destroy the enemy to the north and seize "Objective Red." Prepare to continue the attack to the north on order.

(3) 47th Infantry Division: When relieved by the 1st Armored Division will assemble and be prepared for commitment north to assist in exploiting the break-through or where ever necessary in the Corps Zone.

(4) Btry "A" 1st Very Heavy Field Arty Bn (280-mm gun): Occupy positions in the north end of Frenchman Flat under cover of darkness H-1 Day prepared to register in Zone by radar prior to H-12 Hours on H-Day.

4. Special Exercise

a. Participating troops 369th EASR (-Boat Bn) attached to 1st Armd Div.

b. The Regt (-) will occupy prepared positions in Yucca Flats 7000 yards from ground zero of Shot 8 Tower at H-Hour on H-Day.

c. After the nuclear detonation and immediately after the shock wave has passed, the Regt (-) will attack on foot, to secure "Objective

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Green" or alternate objective as directed. On arrival at "Objective," troops will assemble and prepare to pass through equipment display areas in administrative march formations.

STORKE
Brig Gen

APPENDIX:

"A" Situations Overlay

"B" Special Exercise

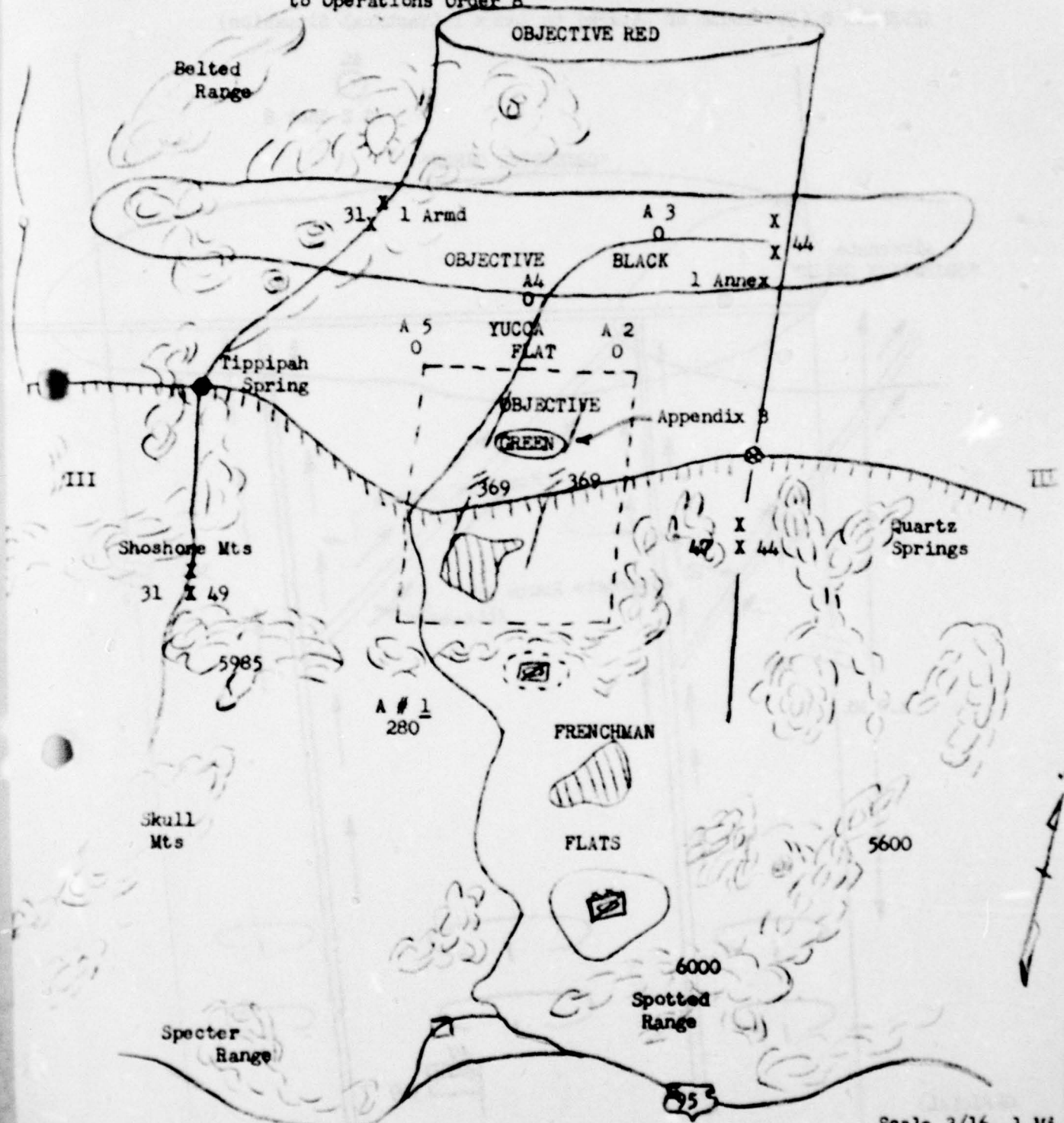
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Appendix A (Tactical Situation) to Annex 1
to Operations Order B



On Call 280 Atomic Concentrations — A 1
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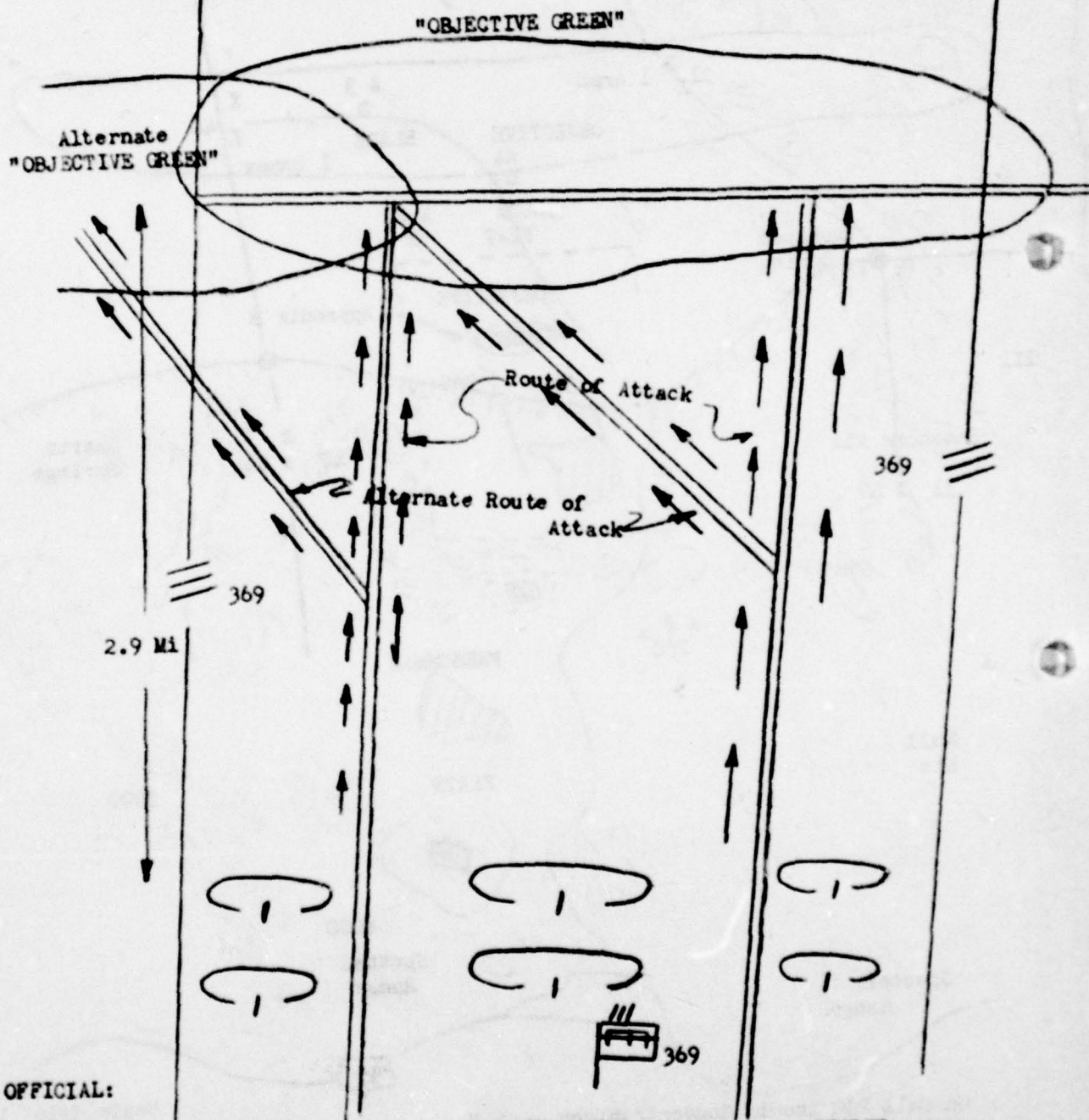
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APPENDIX B (369 Route of Attack) to Annex 1 (Tactical Situation)

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ANNEX 2 (March Table) To Operation Order 8,
Exercise DESERT ROCK IV How

Hq Camp Desert Rock
Las Vegas, Nevada
261000U May 1952

UNIT	FROM	TO	SPEED MPH	TIME LENGTH	TIME OF MOVEMENT	ARRIVE	CLEAR	CLOSE
Control Group	Cp Desert Rock	IP	10	3 Min	H-203	H-196	H-193	
"	IP	Check Gate #1	25	"		H-190	H-187	
"	Check Gate #1	Check Gate #2	25	"		H-184	H-181	
"	Check Gate #2	Check Pt #1	25	"		H-160	H-157	
"	Check Point #1	RJ-24	25	"		H-129	H-126	
"	RJ-24	RJ-17	10	"		H-126	H-123	
"	RJ-17	RJ-18	10	"		H-124	H-121	
"	RJ-18	RJ-20	10	"		H-120	H-117	
"	RJ-20	Entrenchment Area	10	"		H-118		H-115
"	Entrenchment Area M	Parking Area M	10	"	H-105	H-101		H- 98
"	Parking Area M	Entrenchment Area	10	"	H-Hour 1/	H/3		H/6
"	Entrenchment Area	RJ-18	10	"	R-Hour	R/4	R/7	
"	RJ-18	RJ-1	10	"		R/16	R/19	
"	RJ-1	RJ-3	15	"		R/19	R/22	
"	RJ-3	Parking Area P	15	"		R/20		R/23
"	Parking Area P	RJ-3	15	"	R/190	R/193	R/196	
"	RJ-3	RJ-5	15	"		R/195	R/198	
"	RJ-5	IP	25	"		R/270	R/273	
"	IP	Cp Desert Rock	10	"		R/277		R/280

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UNIT	FROM	TO	SPEED MPH	TIME LENGTH	TIME OF MOVEMENT	ARRIVE	CLEAR	CLOSE
369 EASR Group #1	Cp Desert Rock	IP	10	10 Min	H-188	H-181	H-171	
"	IP	Check Gate #1	25	"		H-175	H-165	
"	Check Gate #1	Check Gate #2	25	"		H-169	H-159	
"	Check Gate #2	Check Pt #1	25	"		H-135	H-125	
"	Check Pt #1	RJ-24	25	"		H-104	H- 94	
"	RJ-24	RJ-17	10	"		H-102	H- 92	
"	RJ-17	RJ-18	10	"		H-100	H- 90	
"	RJ-18	RJ-21	10	"		H-106		H- 96
"	RJ-21	Parking Area O	10	"	H-86	H- 84		H- 74
"	Parking Area O	RJ-21	10	"	H-Hour 2/ H-102	H-102	H- 12	
"	RJ-21	RJ-25	2	"		H- 72	H- 82	
"	RJ-25	RJ- 8	2	"		H- 99	H-109	
"	RJ- 8	Parking Area P	10	"		H-107		H-177
"	Parking Area P	RJ-2	15	"	R-130	R-183	R-193	
"	RJ-2	RJ-5	15	"		R-185	R-195	
"	RJ-5	IP	25	"		R-260	R-270	
"	IP	Cp Desert Rock	10	"		R-267		R-277

369 EASR Group #2	Cp Desert Rock	IP	10	"	H-173	H-166	H-156	
"	IP	Check Gate #1	25	"		H-160	H-150	
"	Check Gate #1	Check Gate #2	25	"		H-154	H-144	
"	Check Gate #2	Check Pt #1	25	"		H-130	H-120	
"	Check Pt #1	RJ-24	25	"		H- 99	H- 89	
"	RJ-24	RJ-17	10	"		H- 97	H- 87	

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UNIT	FROM	TO	SPEED MPH	TIME LENGTH	TIME OF MOVEMENT	ARRIVE	CLEAR	CLOSE
369 EASR Group #2	RJ-17	RJ-18	10	10 Min		H- 95	H- 85	
Continued	RJ-18	RJ-22	10	"		H- 92		H- 82
"	RJ-22	Parking Area N	10	"	H- 72	H- 70		H- 50
"	Parking Area N	RJ-22	10	"	H-Hour 2/	H/ 2	H/ 12	
"	RJ-22	RJ-26	2	"		H/ 72	H/ 82	
"	RJ-26	RJ-27	2	"		H/ 99	H/109	
"	RJ-27	Parking Area P	10	"		H/104		H/114
"	Parking Area P	RJ-2	15	"	R/170	R/173	R/183	
"	RJ-2	RJ-5	15	"		H/175	R/185	
"	RJ-5	IP	25	"		R/250	R/260	
"	IP	Cp Desert Rock	10	"		R/257		R/267
Observer Group	Cp Desert Rock	IP	10	3 Min	H-154	H-147	H-144	
"	IP	Check Gate #1	25	"		H-141	H-138	
"	Check Gate #1	Check Gate #2	25	"		H-135	H-132	
"	Check Gate #2	Check Ft #1	25	"		H-111	H-108	
"	Check Point #1	RJ-24	25	"		H- 80	H- 77	
"	RJ-24	RJ-17	10	"		H- 78	H- 75	
"	RJ-17	RJ-18	10	"		H- 76	H- 73	
"	RJ-18	RJ-20	10	"		H- 74	H- 71	
"	RJ-20	Entrenchment Area	10	"		H- 72		H- 69
"	Entrench- ment Area M	Parking Area	10	"	H- 64	H- 62		H- 59
"	Parking Area M	Entrenchment Area	10	"	H/ 2 1/	H/ 4		H/ 7
"	Entrench- ment Area	RJ-20	10	"	R/ 5	R/7	R/ 10	
"	RJ-20	RJ-18	10	"		R/ 9	R/ 12	

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UNIT	FROM	TO	SPEED MPH	TIME LENGTH	TIME OF MOVEMENT	ARRIVE	CLEAR	CLOSE
Observer								
Group	RJ-18	RJ-1	10	3 Min		R/ 24	R/ 27	
Continued	RJ-1	RJ-3	15	"		R/28	R/ 31	
"	RJ-3	Parking Area P	15	"		R/29		R/32
"	Parking Area P	Ground Zero	Walk	2 Min	R/ 42	R/102	R/104	
"	Ground Zero	Parking Area P	Walk	"		R/142		R/144
"	Parking Area P	RJ-2	15	3 Min	R/154	R/155	R/158	
"	RJ-2	RJ-5	20	"		R/159	R/162	
"	RJ-5	IP	25	"		R/234	R/237	
"	IP	Cp Desert *Rock	10	"		R/241		R/244
Commanding General & Party	Cp Desert Rock IP	IP	10	1 Min	H-120	H-113	H-112	
"	Check Gate #1	Check Gate #2	25	"		H-110	H-109	
"	Check Gate #1	Check Gate #2	25	"		H-106	H-105	
"	Check Gate #2	Check Pt #1	25	"		H- 91	H- 90	
"	Check Point #1	RJ-24	25	"		H- 71	H- 70	
"	RJ-24	RJ-17	10	"		H- 68	H- 67	
"	RJ-17	RJ-18	10	"		H- 66	H- 65	
"	RJ-18	RJ-20	10	"		H- 62	H- 61	
"	RJ-20	Entrenchment Area	10	"		H- 60		H- 59
"	Entrenchment Area	Parking Area M	10	"	H- 50	H- 46		H- 45
"	Parking Area M	Entrenchment Area	10	"	H-Hour 1/	H/ 4		H/ 5
"	Entrenchment Area	RJ-20	10	"	R-Hour	R/ 2	R/ 3	
"	RJ-20	RJ-18	10	"		R/ 6	R/ 7	
"	RJ-18	RJ-1	10	"		R/ 21	R/ 22	

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UNIT	FROM	TO	SPEED MPH	TIME LENGTH	TIME OF MOVEMENT	ARRIVE	CLEAR	CLOSE
Commanding General & Party	RJ-1	RJ-3	15	1 Min		R/ 25	R/ 26	
Con't	RJ-3	Parking Area P		"		R/ 26		R/ 27
"	Parking Area P	Ground Zero	Walk	1 Min	R/30	R/90	R/ 91	
"	Ground Zero	Parking Area P	Walk	"		R/140		R/141
"	Parking Area P	RJ-3	10	"		R/140	R/47	
"	RJ-3	RJ-5	20	"		R/150	R/151	
"	RJ-5	IP	25	"		R/195	R/196	
"	IP	Cp Desert Rock	10	"		R/202		R/203

NOTES: 1/ Vehicles move to position in rear of Loading Area. Vehicles move to loading area on order.
 2/ Vehicles move to rear of BCT and follow troops on march to Parking Area P.

2. Distance between vehicles on road will be twice the speedometer in yards.
 3. Lead vehicle in each serial will stop at all AEC check gates to identify serial.

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APPENDICES:

- A - Diagramatic sketch Yucca Flat, Route of March
- B - Diagramatic sketch of Entrenchment Area
- C - Diagramatic sketch of Ground Zero
- D - Diagramatic sketch of Yucca Flats, showing alternate plan of dismounted march of troops.
- E - March Table to Area #6

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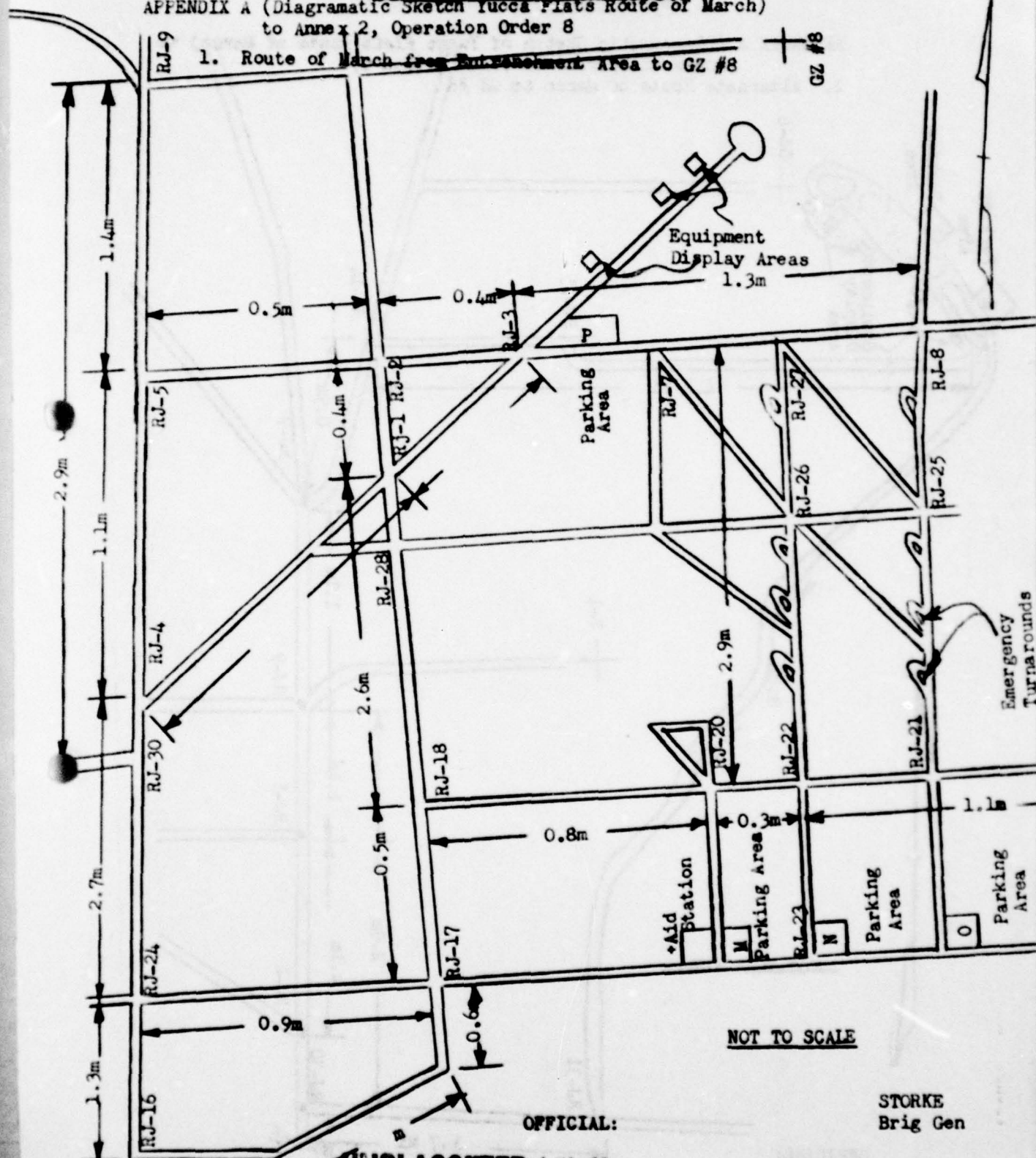
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APPENDIX A (Diagrammatic Sketch Yucca Flats Route of March)
to Annex 2, Operation Order 8

1. Route of March from Encampment Area to GZ #8

1. Route of March from Encampment Area to GZ #8



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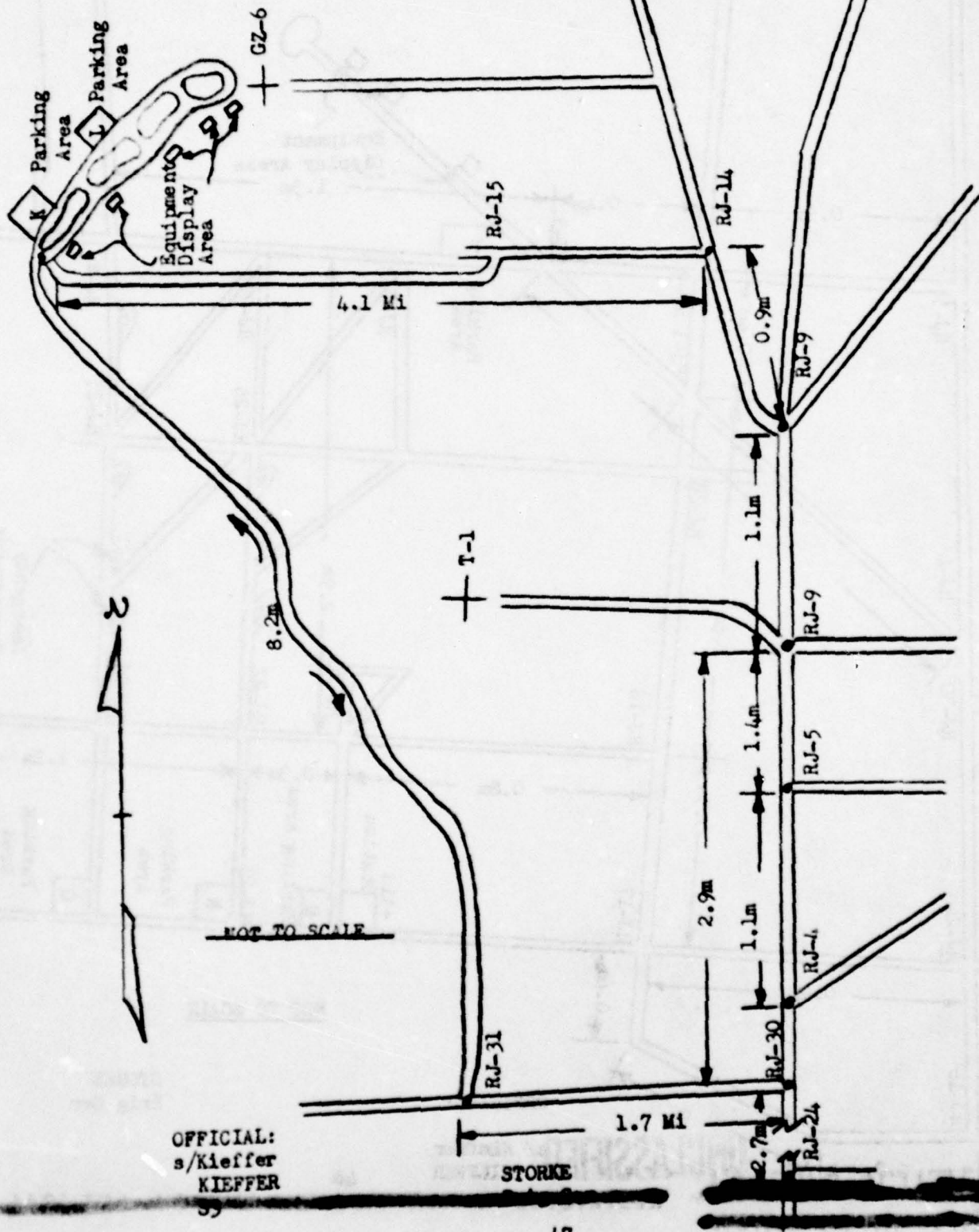
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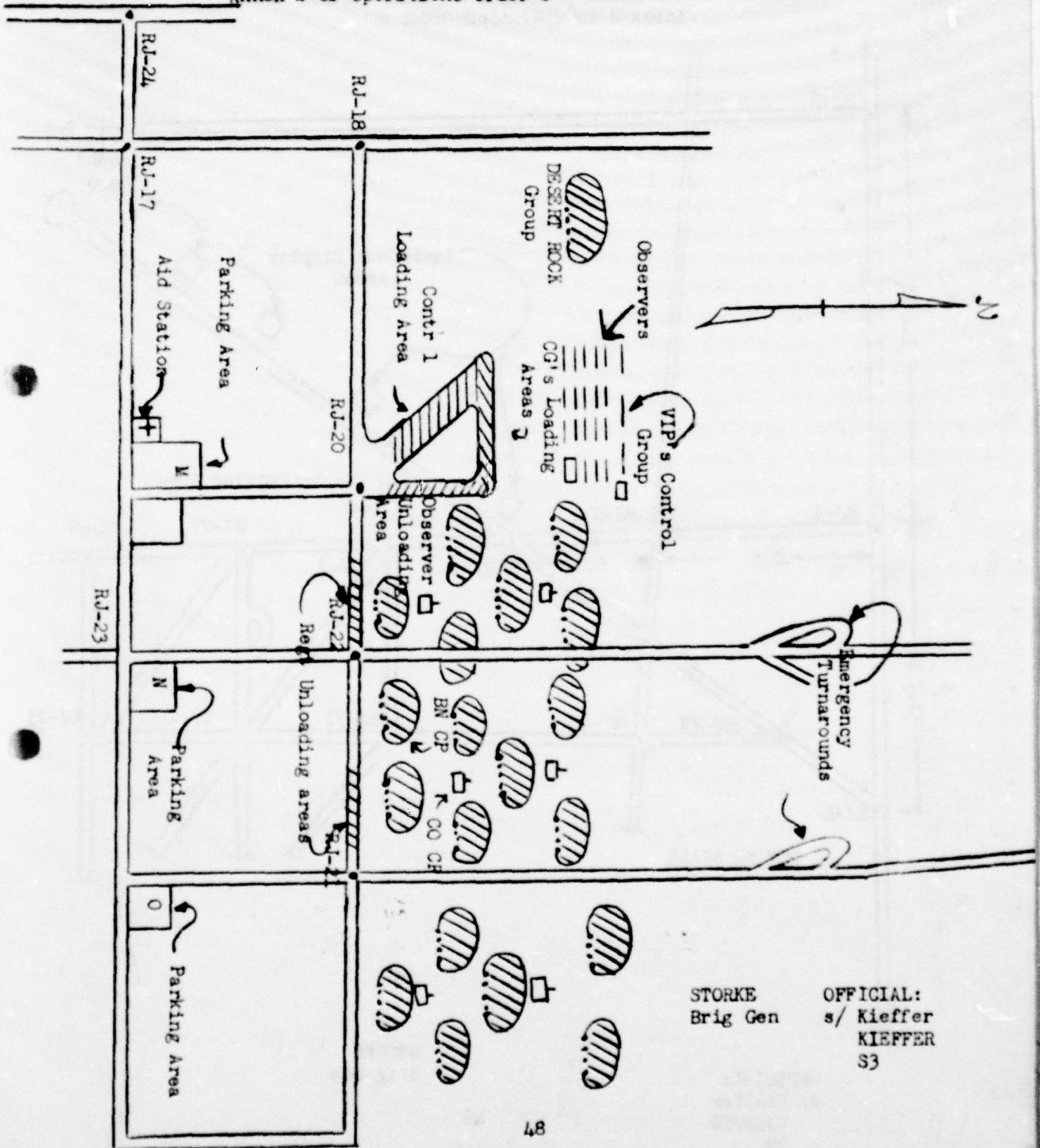
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APPENDIX A (Diagrammatic Sketch of Yucca Flats Route of March) to
Annex to Operations Order 8 (Con't)
2. Alternate Route of March to GZ #6



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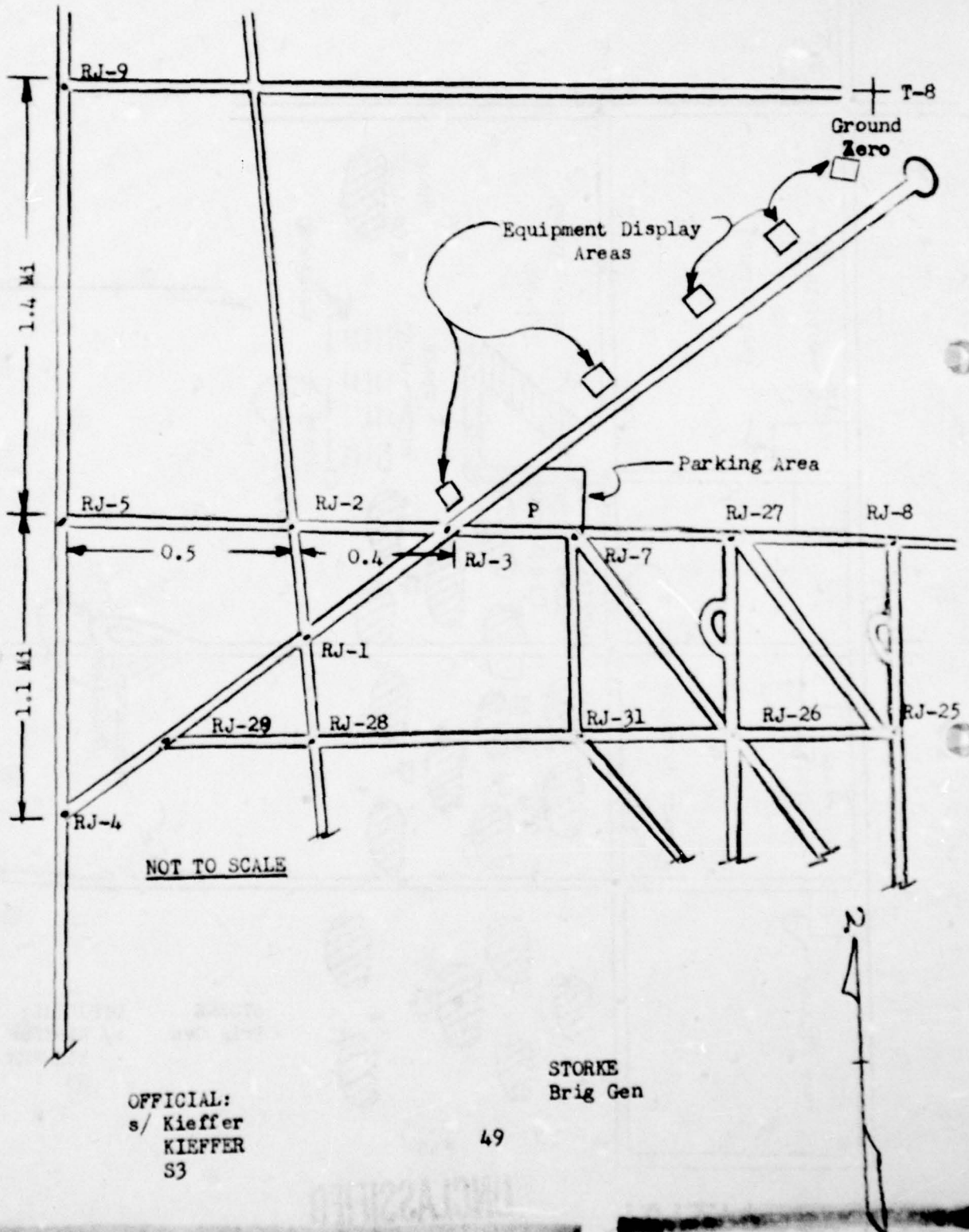
APPENDIX B (Diagrammatic Sketch of Entrenchment Area) to
Annex 2 of Operations Order 8



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APPENDIX C (Diagrammatic Sketch of Ground Zero)
Annex 2 to Operation Order 8

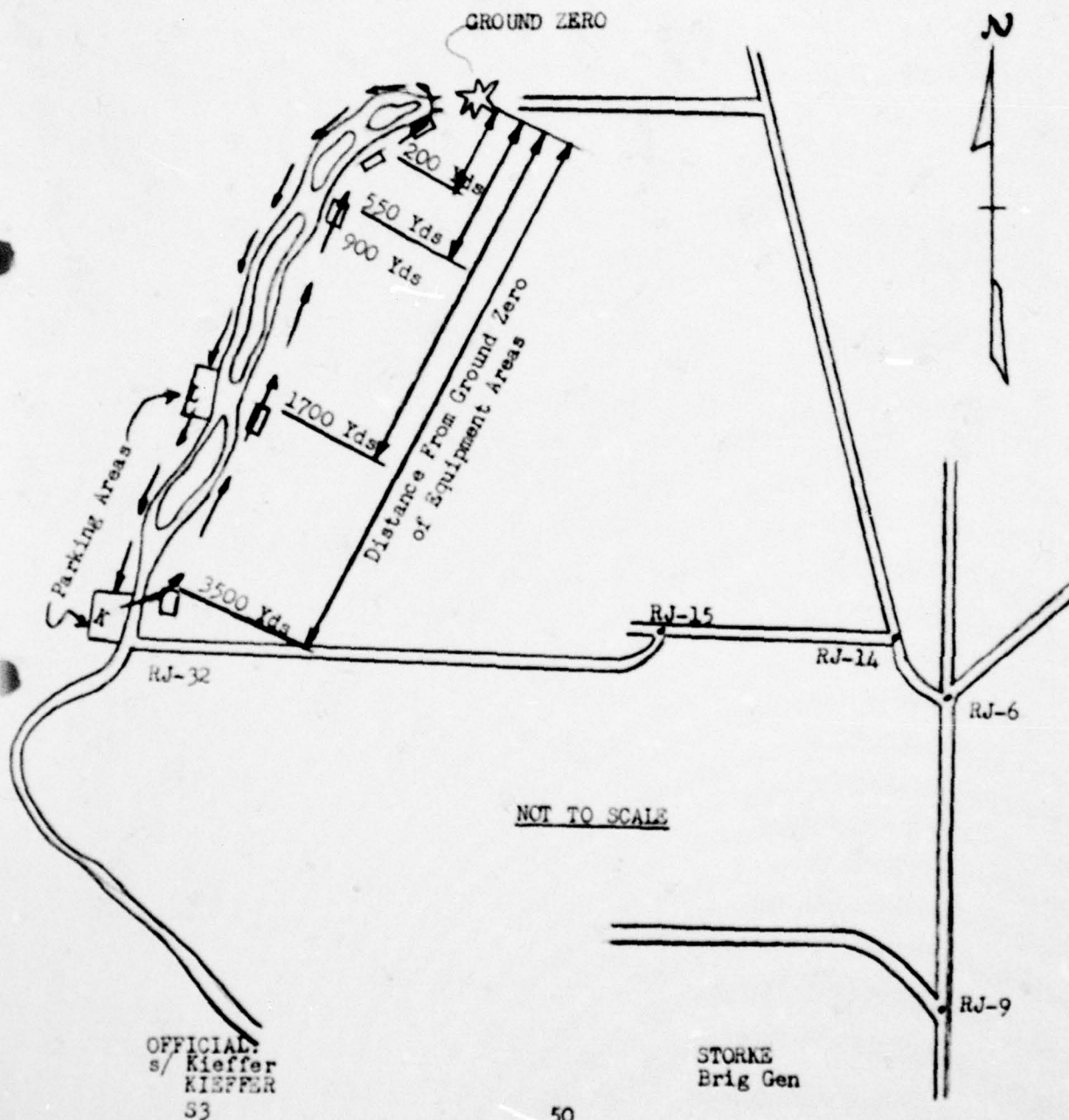


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APPENDIX D (Diagrammatic Sketch Yucca Flats Showing Alternate
Plan of Dismounted March of Troops)
Annex 2 to Operation Order 8



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APPENDIX E (March Table to Area # 6) to Annex 2,
Operation Order 8, Exercise DESERT ROCK IV How

UNIT	FROM	TO	SPEED MPH	TIME LENGTH	TIME OF MOVEMENT	ARRIVE	CLEAR	CLOSE
Control Group	RJ-20	RJ-18	10	3 Min	R-Hour	R/14	R/7	
"	RJ-18	RJ-17	10	"		R/6	R/9	
"	RJ-17	RJ-24	10	"		R/9	R/12	
"	RJ-24	RJ-6	40	"		R/19	R/22	
"	RJ-6	RJ-14	40	"		R/21	R/24	
"	RJ-14	RJ-15	20	"		R/24	R/27	
"	RJ-15	Parking Area K	10	"		R/49		R/52
"	Parking Area K	RJ-31	10	"	R/240	R/290	R/293	
"	RJ-31	RJ-30	10	"		R/296	R/299	
"	RJ-30	IP	20	"		R/366	R/369	
"	IP	Cp Desert Rock	10	"		R/373		R/376
369 EASH Group #1	RJ-25	RJ-26	10	10 Min	R/30	R/42		
"	RJ-26	RJ-28	10	"		R/32	R/42	
"	RJ-28	RJ-29	10	"		R/44	R/54	
"	RJ-29	RJ-4	10	"		R/46	R/56	
"	RJ-4	RJ-6	25	"		R/56	R/66	
"	RJ-6	RJ-14	25	"		R/58	R/68	
"	RJ-14	RJ-15	20	"		R/61	R/71	
"	RJ-15	Parking Area K	10	"		R/86		R/96
"	Parking Area K	Ground Zero	Walk	5 Min	R/106	R/166	R/171	
"	Ground Zero #6	Parking Area K	Walk	"		R/206		R/211
"	Parking Area K	RJ-31	10	10 Min	R/231	R/281	R/291	
"	RJ-31	RJ-30	10	"		R/287	R/297	
"	RJ-30	IP	25	"		R/357	R/367	
"	IP	Cp Desert Rock	10	"		R/364		R/374

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UNIT	FROM	TO	SPEED MPH	TIME LENGTH	TIME OF MOVEMENT	ARRIVE	CLEAR	CLOSE
369 EASR Group #2	RJ-26	RJ-28	10	10 Min	R/22	R/32	R/42	
"	RJ-28	RJ-29	10	"		R/34	R/44	
"	RJ-29	RJ- 4	10	"		R/36	R/46	
"	RJ- 4	RJ- 6	25	"		R/46	R/56	
"	RJ- 6	RJ-14	25	"		R/48	R/58	
"	RJ-14	RJ-15	20	"		R/51	R/61	
"	RJ-15	Parking Area K	10	"		R/76		R/86
"	Parking Area K	Ground Zero #6	Walk	5 Min	R/96	R/156	R/161	
"	Ground Zero #6	Parking Area K	Walk	"		R/196		R/201
"	Parking Area K	RJ-31	10	10 Min	R/216	R/266	R/276	
"	RJ-31	RJ-30	10	"		R/272	R/282	
"	RJ-30	IP	25	"		R/342	R/352	
"	IP	Cp Desert Rock	10	"		R/349		R/359
Observers	Entrench- ment Area	RJ-20	10	3 Min	R/10	R/11	R/14	
"	RJ-20	RJ-18	10	"		R/15	R/18	
"	RJ-18	RJ-17	10	"		R/17	R/20	
"	RJ-17	RJ-24	10	"		R/20	R/23	
"	RJ-24	RJ- 6	25	"		R/37	R/40	
"	RJ- 6	RJ-14	25	"		R/39	R/42	
"	RJ-14	RJ-15	20	"		R/42	R/45	
"	RJ-15	Parking Area K	10	"		R/67		R/70
"	Parking Area K	Ground Zero	Walk	2 Min	R/80	R/140	R/142	
"	Ground Zero	Parking Area K	Walk	"		R/180		R/182
"	Parking Area K	RJ-31	10	3 Min	R/185	R/230	R/233	

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UNIT	FROM	TO	SPEED MPH	TIME LENGTH	TIME OF MOVEMENT	ARRIVE	CLEAR	CLOSE
Observers								
Continued	RJ-31	RJ-30	10	3 Min		R/236	R/239	
"	RJ-30	IP	25	"		R/306	R/309	
"	IP	Cp Desert Rock	10	"		R/313		R/316
Commanding								
General & Party	Entrench- ment Area	RJ-20	10	1 Min	R/3	R/4	R/5	
"	RJ-20	RJ-18	10	"		R/8	R/9	
"	RJ-18	RJ-24	10	"		R/13	R/14	
"	RJ-24	RJ-6	40	"		R/23	R/24	
"	RJ-6	RJ-14	40	"		R/25	R/26	
"	RJ-14	RJ-15	20	"		R/28	R/29	
"	RJ-15	Parking Area K	10	"		R/53		R/54
"	Parking Area K	Ground Zero	Walk	"	R/61	R/121	R/122	
"	Ground Zero	Parking Area K	Walk	"		R/161		R/162
"	Parking Area K	RJ-31	10	"	R/172	R/222	R/223	
"	RJ-31	RJ-30	10	"		R/228	R/229	
"	RJ-30	IP	40	"		R/273	R/274	
"	IP	Cp Desert Rock	10	"		R/280		R/281

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ANNEX 4 (Schedule of Events) to Operation Order 8,
Exercise DESERT ROCK IV How

1. Control Group

<u>Tenta- tive Time</u>	<u>Adjusted Time</u>	
2400 to 0100	H-300 to H-240	Breakfast
0122	H-218	Muster, monitor checks each individual for film badge, mount vehicles
0137	H-203	Depart Camp Desert Rock
0144	H-196	Arrive IP.
0150	H-190	Arrive Check Gate #1
0156	H-184	Arrive Check Gate #2
0220	H-160	Arrive Check Point
0302	H-118	Arrive Entrenchment Area
0322	H- 98	Vehicles close in Parking Area M
0400	H- 60	Indoctrination and orientation talk over PA system
0500	H-Hour	Shot
0502	H/ 2	Rad-Safe survey teams depart to comply with Appendix A, Annex 7
0503	H/ 3	Vehicles will move to loading location
0600	R-Hour	Advance Control Group A departs for Parking Area P. Advance Control Group B departs for Parking Area L. One officer remains at CP throughout Exercise.
0623	R/23	Group A closes in Parking Area P
0900	R/180	Monitor all personnel and vehicles
0905	R/185	Muster, mount vehicles
0910	R/190	Depart Parking Area P

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<u>Tenta- tive Time</u>		<u>Adjusted Time</u>	
1013	R/270		Arrive IP
1023	R/280		Close Camp Desert Rock, muster, return film badges to issuing party
2. a. 369 EASR (-) Group # 1.			
0015	H-285		Reveille
0030 to 0130	H-270 to H-210		Breakfast
0137	H-203		Muster, monitor checks each individual for film badge, mount vehicle
0152	H-188		Depart Camp Desert Rock
0159	H-181		Arrive IP
0205	H-175		Arrive Check Gate #1
0211	H-169		Arrive Check Gate #2
0245	H-135		Arrive Check Point #1
0314	H-106		Arrive RJ-21
0324	H- 96		Close RJ-21, personnel occupy prepared positions
0346	H- 74		Vehicles close in Parking Area O
0400	H- 60		Indoctrination and orientation talk over PA System
0500	H-Hour		Shot
0502	H/ 2		Attack on foot via RJ-21, RJ-33, RJ-25, RJ-8 to secure "Objective Green," prepared to use alternate route at any time during advance. Vehicles follow column at march pace. Column commander will check with Control Point at each red and yellow communications stake for instructions using wire or radio. If no instructions are received by time of arrival at RJ-25, column will halt until directed to continue advance.

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<u>Tenta- tive Time</u>	<u>Adjusted Time</u>	
0649	H/109	Depart Objective Green for walk through equipment display area following staked out route and Rad-Safe instructions.
0647	H/107	Vehicles arrive Parking Area P
0809	H/189	Depart forward display areas
0849	H/229	Arrive at Parking Area P, monitor all personnel and vehicles
0849	H/229	Muster and mount vehicles
0900	R/180	Depart for Camp Desert Rock
1020	R/260	Arrive IP
1027	R/267	Arrive Camp Desert Rock
1028	R/277	Close Camp Desert Rock

2. b. 369 EASR (-) Group #2

0015	H-285	Reveille
0030 to 0130	H-270 to H-210	Breakfast
0145	J-195	Muster, monitor checks each individual for film badge, mount vehicle
0207	H-173	Depart Camp Desert Rock
0214	H-166	Arrive IP
0220	H-160	Arrive Check Gate #1
0226	H-154	Arrive Check Gate #2
0250	H-130	Arrive Check Point #1
0328	H- 92	Arrive RJ-22
0338	H- 82	Close RJ-22
0400	H- 60	Vehicles close in Parking Area N
0400	H- 60	Indoctrination and orientation talk over PA System

Tenta-
tive
Time

Adjusted
Time

0500
0502

H-Hour
H/ 2

Attack on foot via RJ-22, RJ-32, RJ-26, RJ-27, to secure "Objective Green," prepared to use alternate route at any time during advance. Vehicles follow column at march pace. Column commander will check with Control Point at each red and yellow communications stake for instructions using wire or radio. If no instructions are received by time of arrival at RJ-26, column will halt until directed to continue advance.

0649 H/109

Depart Objective Green for walk through display areas, following staked out route and Rad-Safe instructions.

0644 H/104

Vehicles arrive Parking Area P

0759 H/179

Depart forward display areas.

0839 H/219

Arrive at Parking Area P, monitor all personnel and vehicles.

0839 H/219

Muster and mount vehicles

0928 R/170

Depart for Camp Desert Rock

1048 R/250

Arrive IP

1055 R/257

Arrive Camp Desert Rock

1105 R/267

Close Camp Desert Rock, dismount, muster and return film badges to issuing agency.

3. Observer Group.

0045 H-255

Reveille

0100 H-240
to to

0200 H-180

Breakfast

0211 H-169

Muster, monitor checks individuals for film badges, mount vehicles.

0226 H-154

Depart Camp Desert Rock

0233 H-147

Arrive IP

0239 H-141

Arrive Check Gate #1

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<u>Tenta- tive Time</u>		<u>Adjusted Time</u>	
0245	H-135		Arrive Check Gate #2
0309	H-111		Arrive Check Point # 1
0348	H- 72		Arrive at Entrenchment Area
0351	H- 69		Close in Entrenchment Area
0401	H- 59		Vehicles close in Parking Area M
0400	H- 60		Indoctrination and orientation talk over PA System
0500	H-Hour		Shot
0500 to 0520	H-Hour to H/ 20		Observation and orientation talk over PA System
0505	H/ 5		Vehicles move to loading location
0612	R/12		Mount and depart Entrenchment Area
0629	R/ 29		Arrive Parking Area P
0632	R/32		Close Parking Area P
0642	R/ 42		Depart Parking Area P for walk through equipment display area to Ground Zero subject to Rad-Safe requirements.
0744	R/104		Depart Ground Zero
0822	R/142		Arrive Parking Area P, monitor all personnel and vehicles
0833	R/153		Muster, mount vehicles
0834	R/154		Depart for Camp Desert Rock
0854	R/234		Arrive IP
0901	R/241		Arrive Camp Desert Rock
0904	R/244		Close Camp Desert Rock, dismount, muster and return film badges to issuing agency.

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4. Commanding General and Party.

<u>Tenta- tive Time</u>	<u>Adjusted Time</u>	
0245	H-135	Muster, monitor will check each individual for film badge, mount vehicles
0307	H-113	Arrive IP
0310	H-110	Arrive Check Gate #1
0314	H-106	Arrive Check Gate #2
0329	H- 91	Arrive Check Point #1
0359	H- 61	Arrive at Entrenchment Area
0400	H- 60	Close in Entrenchment Area
0500	H-Hour	Shot
0500 to	H-Hour to	
0520	H/ 20	Observation and explanation of characteristics of the atomic explosion over the PA System
0503	H/3	Vehicles move to loading location
0605	R/ 5	Mount and depart Entrenchment Area
0626	R/ 26	Arrive Parking Area P.
0627	R/ 27	Close Parking Area P
0630	R/ 30	Depart parking area for walk through equipment display area to Ground Zero subject to Rad-Safe requirement
0731	R/ 91	Depart Ground Zero
0820	R/140	Arrive Parking Area P, monitor all personnel and vehicles
0821	R/141	Muster, mount vehicles
0825	R/145	Depart for Camp Desert Rock
0920	R/195	Arrive IP
0927	R/202	Arrive Camp Desert Rock
0928	R/203	Close Camp Desert Rock, dismount, muster, film badges collected by monitor.

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APPENDIX A to Annex 4 to Operation Order 8,
Exercise DESERT ROCK IV How

1. Control Group

<u>Tenta- tive Time</u>		<u>Adjusted Time</u>	
0600	R-Hour		Group B departs Entrenchment Area for Parking Area K
0612	R/49		Arrive Parking Area K
0652	R/52		Close Parking Area K
0955	R/235		Monitor all personnel and vehicles
1000	R/240		Depart Parking Area K
1206	R/366		Arrive IP
1216	R/376		Close Camp Desert Rock, muster, return film badges to issuing agency.

2. 369 EASR BCT Group #1

0630	R/30	Monitor each individual, mount vehicles at RJ-25. Depart for Parking Area K
0726	R/86	Arrive Parking Area K
0736	R/96	Close Parking Area K
0746	R/106	Dismount and march through equipment display area to Ground Zero #6
0846	R/166	Arrive Ground Zero #6
0851	R/171	Clear Ground Zero #6
0926	R/206	Arrive Parking Area K
0931	R/211	Close Parking Area K
0948	R/228	Muster, monitor all personnel, mount vehicles
0951	R/231	Depart for Camp Desert Rock
1157	R/357	Arrive IP
1204	R/364	Arrive Camp Desert Rock

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Time

Adjusted
Time

1214 R/374 Close Camp Desert Rock, muster all personnel,
return film badges to issuing agency.

2. b. 369 EASR BCT Group #2.

0622	R/ 22	Monitor each individual, mount vehicles at RJ-26, depart for Parking Area K
0716	R/ 76	Arrive Parking Area K
0726	R/ 86	Close Parking Area K
0736	R/ 96	Dismounted march through equipment display area to Ground Zero #6
0836	R/156	Arrive Ground Zero #6
0841	R/161	Clear Ground Zero #6
0916	R/196	Arrive Parking Area K
0921	R/201	Close Parking Area K
0934	R/214	Monitor all personnel and vehicles, mount vehicles.
0936	R/216	Depart for Camp Desert Rock
1142	R/342	Arrive IP
1159	R/359	Close Camp Desert Rock, muster, return film badges to issuing agency

3. Observers Group.

0610	R/ 10	Depart Entrenchment Area for Parking Area K
0707	R/ 67	Arrive Parking Area K
0710	R/70	Close Parking Area K
0720	R/ 80	Dismounted march through equipment display area to Ground Zero #6
0820	R/140	Arrive Ground Zero #6
0822	R/142	Clear Ground Zero #6
0900	R/180	Arrive Parking Area K

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<u>Tenta- tive Time</u>		<u>Adjusted Time</u>	
0902	R/182		Close Parking Area K
0902	R/182		Muster, monitor all personnel and vehicles, mount vehicles
0905	R/185		Depart for Camp Desert Rock
1106	R/306		Arrive IP
1113	R/313		Arrive Camp Desert Rock
1116	R/316		Close Camp Desert Rock, muster, return film badges to issuing agency

4. Commanding General and Party.

0603	R/ 3		Depart Entrenchment Area for Parking Area K
0653	R/ 53		Arrive Parking Area K
0654	R/54		Close Parking Area K
0701	R/ 61		March through equipment display area to Ground Zero
0801	R/121		Arrive Ground Zero
0802	R/122		Clear Ground Zero
0841	R/161		Arrive Parking Area K
0850	R/170		Muster, monitor all personnel, mount vehicles
0852	R/172		Depart for Camp Desert Rock
1033	R/273		Arrive IP
1041	R/281		Close Camp Desert Rock, muster, return film badges to issuing agency.

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ANNEX 5 (MP Control) to Operation Order 8,
Exercise DESERT ROCK IV How

1. Omitted.
2. PM, Camp Desert Rock, with Co A, 505th MP Bn will control all military traffic during H-Day in Nevada Proving Grounds.
3. Operational assignment of MP's are as follows:
 - a. Provost Marshal, Camp Desert Rock, will supervise MP operations within test area.
 - b. One (1) Co grade officer will be assigned to each of AEC Gates One (1), Two (2), and Three (3).
 - c. One (1) Co grade officer will be assigned to each of serials two (2), three (3), four (4), and five (5).
 - d. Two (2) EM will be assigned as driver and radio operator for PM.
 - e. One (1) EM each will be assigned as driver to officers assigned to AEC Gates One (1), Two (2), and Three (3).
 - f. One (1) EM each will be assigned as driver and radio operator for serial leaders for serials two (2), three (3), four (4), and five (5).
 - g. One (1) additional EM will be assigned as driver and radio operator for serial five (5). (For Exercise Director).
 - h. One (1) EM will be assigned as driver and radio operator for Rad-Safe.
 - i. One (1) EM will be assigned as driver and radio operator for the Control Group Commander.
 - j. One (1) EM will be assigned as driver and radio operator for S3.
 - k. Two (2) EM will be assigned as motorcycle escorts for the Exercise Director.
 - l. Three (3) EM will be assigned as motorcycle couriers. (May be used at RJ-28 and 29 if required).
 - m. Two (2) EM will be assigned to control traffic at road junction Main Gate, Camp Desert Rock and AEC Road.
 - n. Two (2) EM will be assigned to Check Point One (1).

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o. One (1) EM will be assigned to direct and guide column at AEC Control Point.

p. One (1) EM will be assigned to direct and guide column at the Decontamination Station.

q. One (1) EM will be assigned to direct traffic and guide column at Road Junction #24.

r. One (1) EM will be assigned to direct traffic and guide column at Road Junction #17.

s. One (1) EM will be assigned to direct traffic and guide column at Road Junction #18.

t. One (1) EM will be assigned to direct traffic and guide column at Road Junction #20.

u. One (1) EM will be assigned to direct traffic and guide column at Road Junction #22.

v. One (1) EM will be assigned to direct traffic and guide column at Road Junction #21.

w. Two (2) EM will be assigned to direct the parking, detrucking, and entrucking at Parking Area M.

x. Two (2) EM will be assigned to direct the parking, detrucking, and entrucking at Parking Area N.

y. Two (2) EM will be assigned to direct the parking, detrucking, and entrucking at Parking Area O.

z. Two (2) EM will be assigned to direct the parking, detrucking, and entrucking at Parking Area P.

aa. Two (2) EM will be assigned to direct the parking, detrucking, and entrucking at Parking Area K.

bb. One (1) EM will be assigned to direct traffic and guide column at Road Junction #3.

cc. One (1) EM will be assigned to direct traffic and guide column at Road Junction #1.

dd. One (1) EM will be assigned to direct traffic and guide column at Road Junction #2.

ee. One (1) EM will be assigned to direct traffic and guide column at Road Junction #5.

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ff. Two (2) EM will be assigned to direct traffic and guide column at Road Junction #6.

gg. One (1) EM will be assigned to direct traffic and guide column at Road Junction #14.

hh. One (1) EM will be assigned to direct traffic and guide column at Road Junction #15.

ii. Two (2) NCO's will be assigned to supervise posting of EM at road junctions and parking areas.

4. Personnel and vehicles requirements.

- a. Eight (8) officers and fifty (50) EM.
- b. Nine (9) 1/4 ton trucks with radios.
- c. Three (3) 1/4 ton trucks.
- d. Five (5) motorcycles.
- e. Two (2) 2 1/2 ton trucks.

5. See Annex #6 (Signal).

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ANNEX 6 (Signal) to Operation Order 8,
Exercise DESERT ROCK IV How

1. Command Posts:

Headquarters

Location

Camp Desert Rock

Camp Desert Rock, Nevada

2. Continuous and reliable communication between all elements of this command will be installed, operated, and maintained.

3. a. Signal Corps detachment, Desert Rock, will install, operate and maintain all radio, wire, switchboard, public address and teletypewriter service.

b. Signal Corps detachment, Desert Rock, will procure, issue and process all film badges.

c. Radio silence will be maintained by all radios from H-30 minutes to H-Hour.

4. Signal Detachment Camp Desert Rock will:

a. Install two field wire lines from Desert Rock Base Camp to WOODCHUCK Switchboard.

b. Install two field wire lines from WOODCHUCK Switchboard to Commanding General, C.P.

c. Install one field wire line from WOODCHUCK Switchboard to Commanding Officer, 369th EASR (-).

d. Install one field wire line from WOODCHUCK Switchboard to Commanding Officer, DR Group.

e. Install one field wire line from WOODCHUCK Switchboard to Aid Station.

f. Install one field wire line from WOODCHUCK Switchboard to Parking Areas M, N, O, K, and L.

g. Install two field wire lines from WOODCHUCK Switchboard to Parking Area P.

h. Install one field wire line from WOODCHUCK Switchboard to Decontamination Area.

i. Install one field wire line from Decontamination Area to AEC C.P.

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- j. Install one field wire line from WOODCHUCK Switchboard to RJ-2, RJ-9.
 - k. Install one field wire line from WOODCHUCK Switchboard to AEC OP.
 - l. Install one field line to RJ-8 and RJ-27, terminals to be placed at each turn around.
 5. Install field wire lines from Mercury Forward C.P. for:
 - a. One dial line to WOODCHUCK C.P.
 - b. Two direct lines to WOODCHUCK C.P.
 - c. One P.A. line to Exercise Control C.P.
 6. a. P.A. System will be provided to cover the Troop Entrenchment Area and Parking Areas M. N. and O.
 - b. P.A. System will be controlled from C.P.
 - c. Mobile P.A. Systems will move into Equipment Areas 1, 2, 3, 4, and 5 when cleared by Rad-Safe.
 - d. P.A. line from Mercury Forward C.P. multiple to Exercise Area P.A. Systems.
 7. Provide Mobile Radio Net for Control and supervision of Exercise, to include Rad-Safe Net.
 8. Provide Alternate radio net for Rad-Safe and Exercise Control using SCR 300 radios.
 9. Signal Photo Detachment to be assigned missions as required.
 10. Signal Supply and maintenance located at Camp Desert Rock.
 11. See SOI Index 1. (See Appendix E).

APPENDIX A - Wire Diagram
APPENDIX B - Traffic Diagram
APPENDIX C - Radio Nets
APPENDIX D - Public Address Systems
APPENDIX E - SOI Index 1

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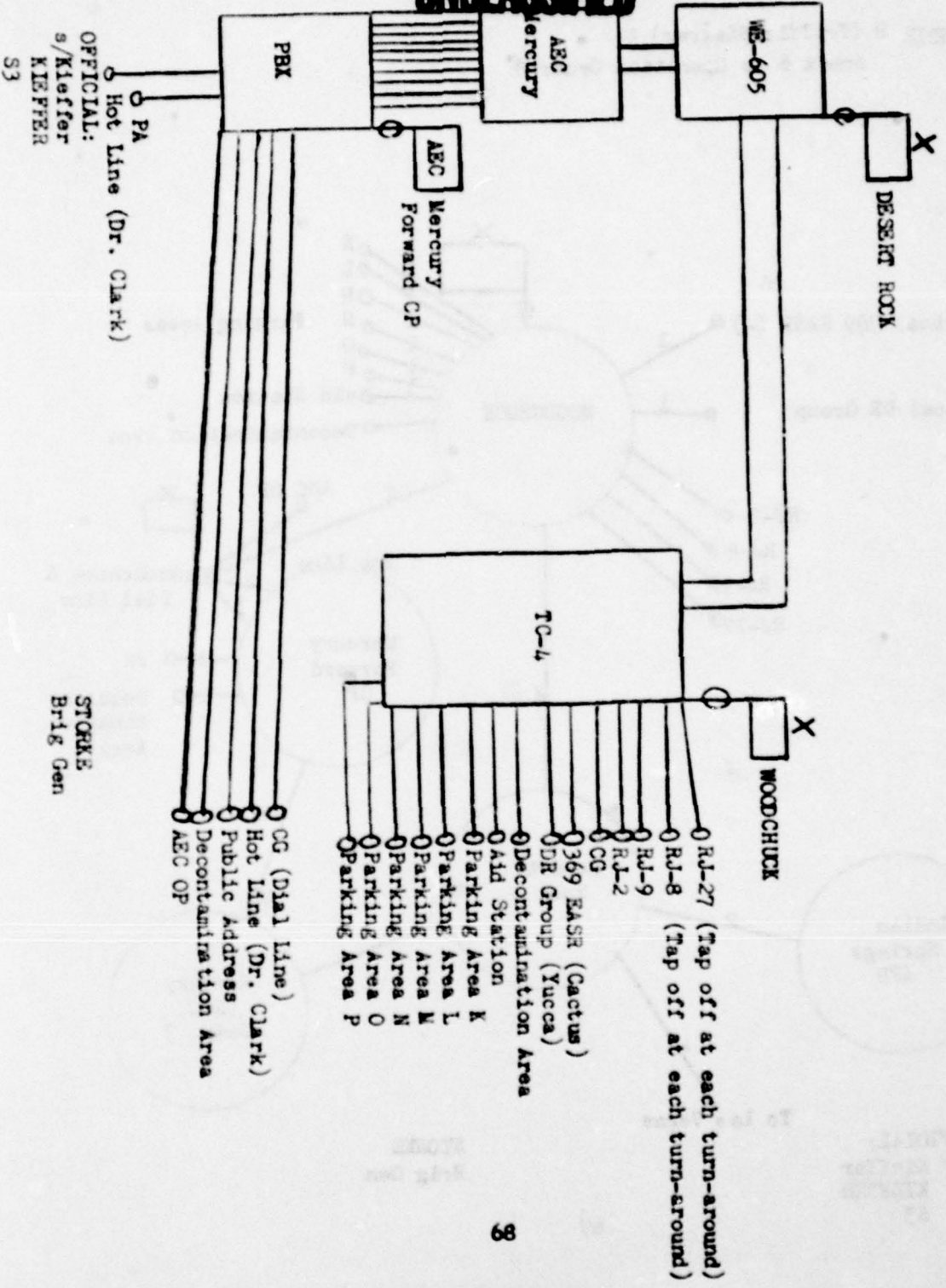
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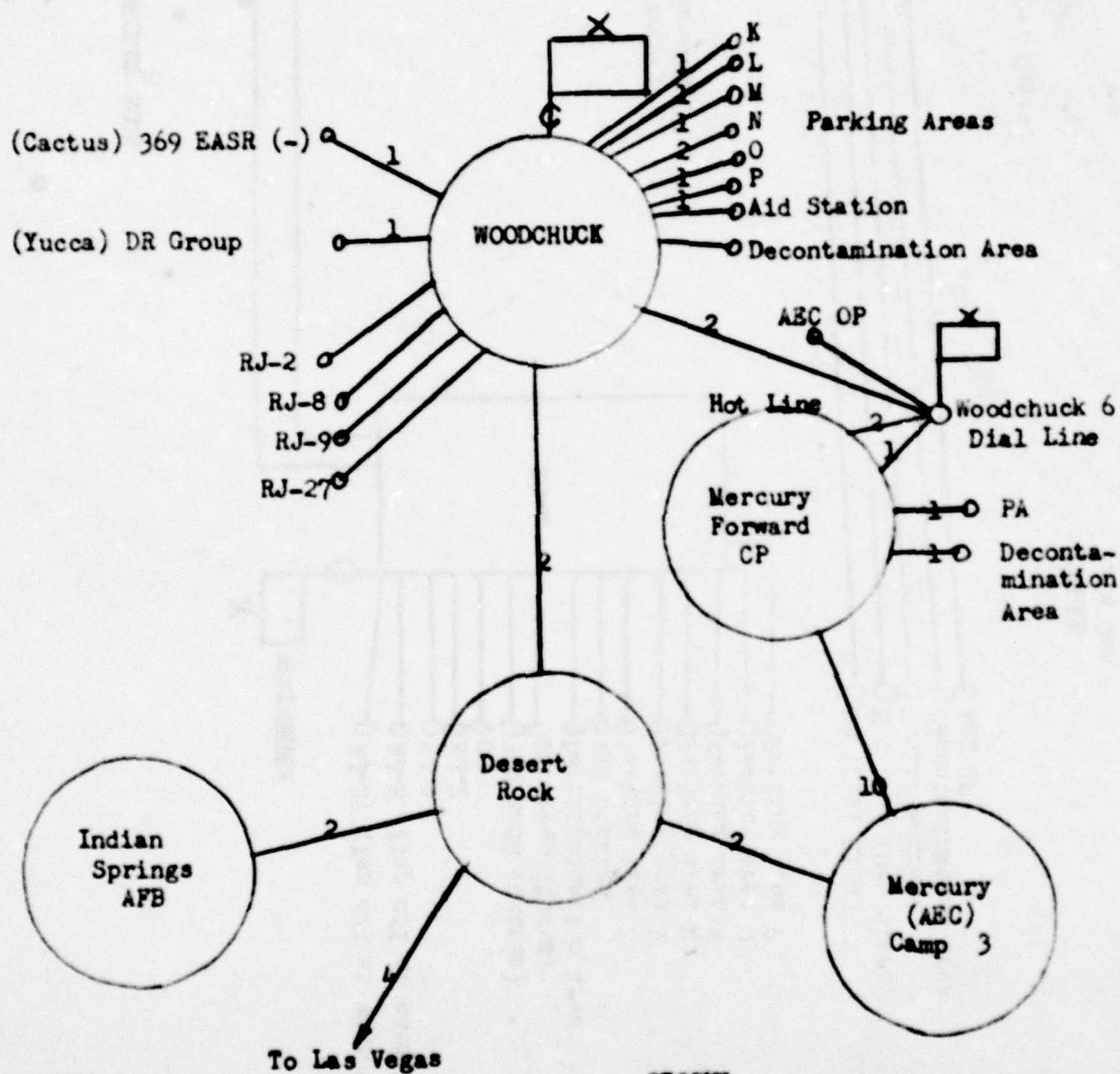
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APPENDIX A (Circuit Diagram) to
Annex 6 to Operation Order 8



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APPENDIX B (Traffic Diagram) to
Annex 6 to Operation Order 8

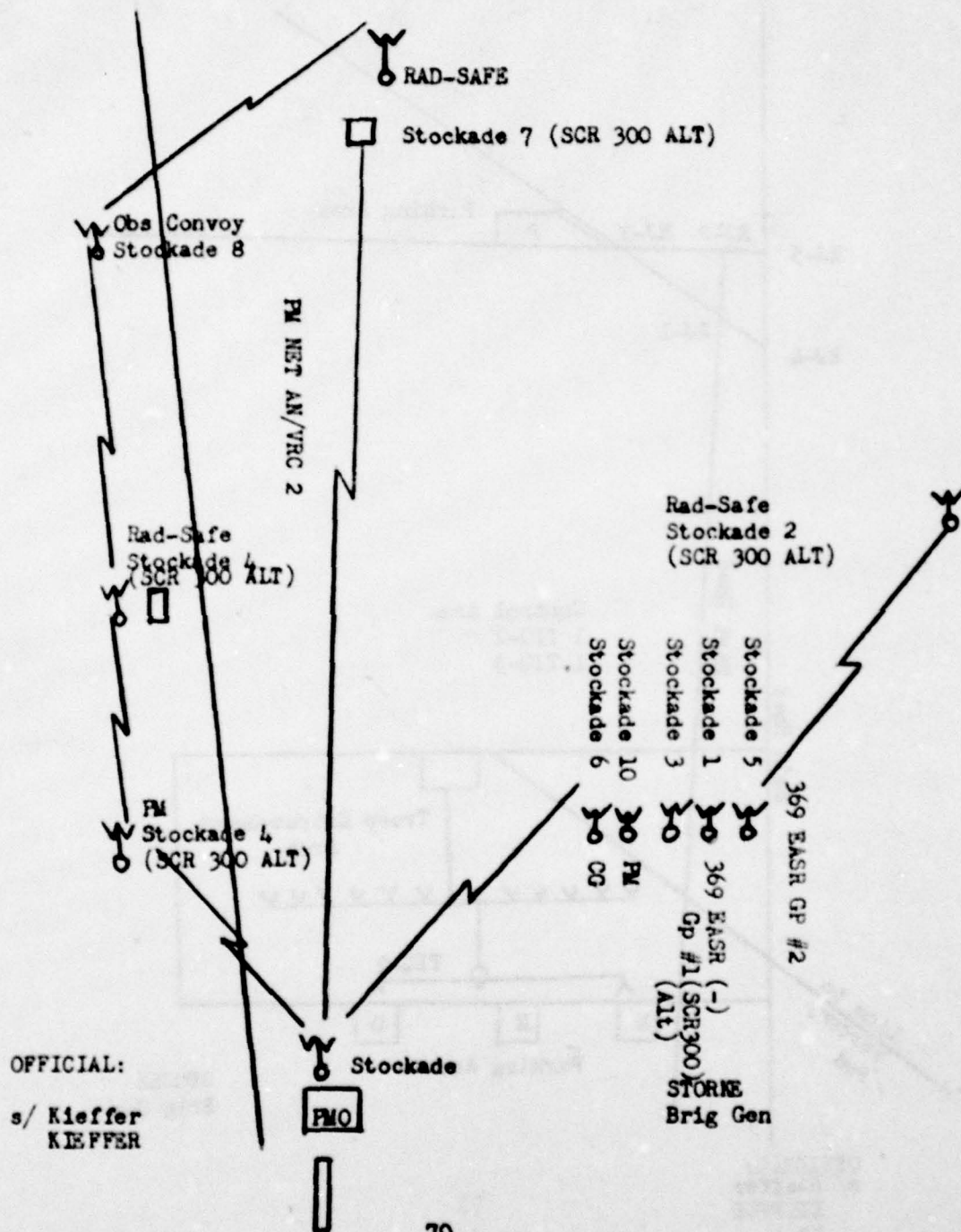


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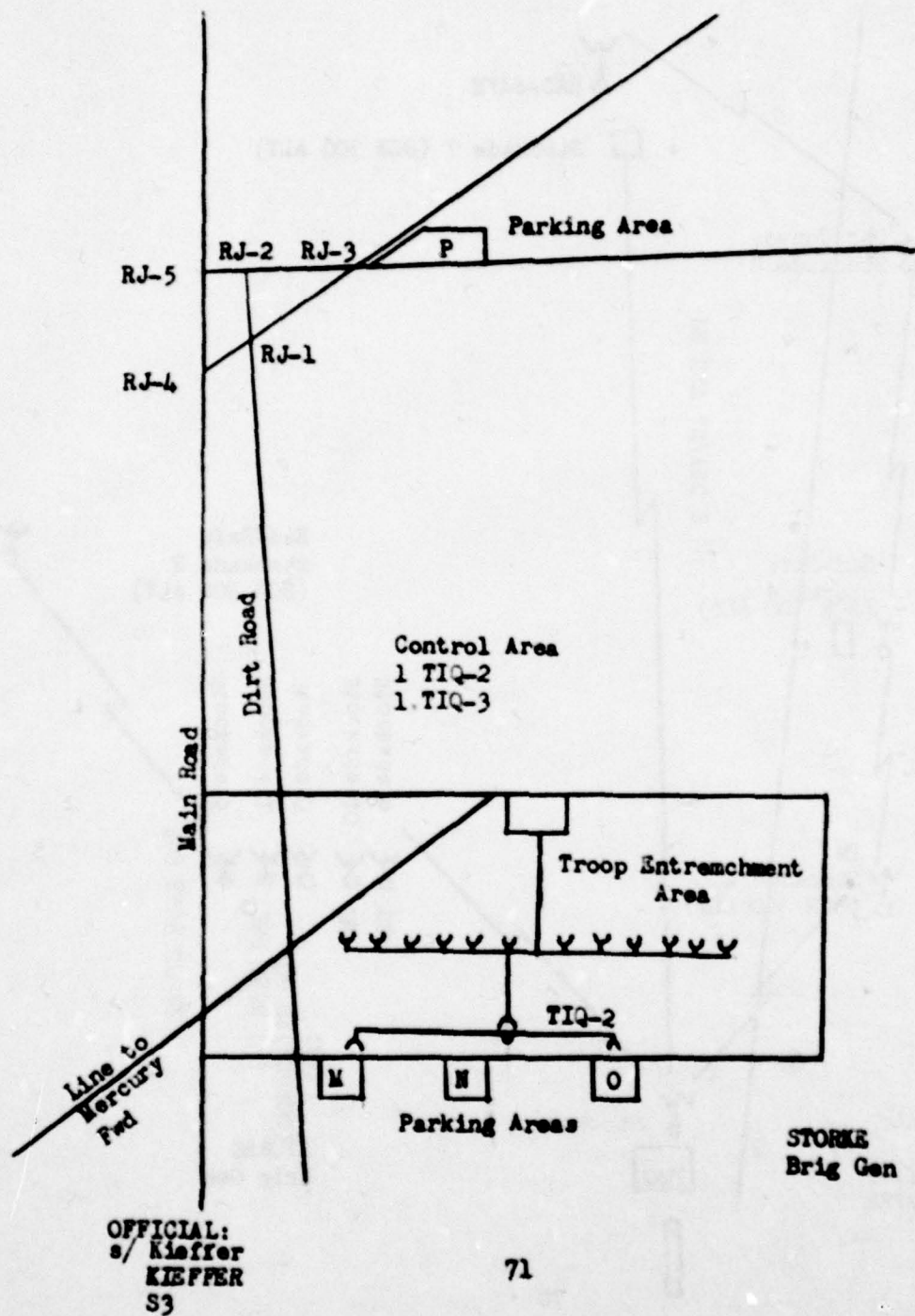
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APPENDIX C (Radio Nets) to
Annex 6 to Operation Order 8

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APPENDIX D (Public Address System) to
Annex 6 to Operation Order 8



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SIGNAL OPERATION INSTRUCTIONS

INDEX

Item No. 1-1

EFFECTIVE: 300800U May 1952

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WIRE SECTION	
Telephone Directory Names	30-1

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Appendix E (SOI) to Annex 6 OPN O 8

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SIGNAL OPERATION INSTRUCTIONS

CONTROL VOICE CALL SIGNS

Item No. 20-1

EFFECTIVE: 300800U May 1952

**Camp Desert Rock Voice Call Sign Allocations for MP Control Net
DESERT ROCK IV:**

NCS Provost Marshal's Office	Stockade
369 EASR (-) Gp #1 (SCR300 ALT)	Stockade -1
Rad-Safe (SCR300 ALT)	Stockade -2
S3	Stockade -3
Rad-Safe (SCR300 ALT)	Stockade -4
369 EASR (-) Gp #2 (SCR300 ALT)	Stockade -5
Commanding General	Stockade -6
Rad-Safe (SCR300 ALT)	Stockade -7
Observers	Stockade -8
Provost Marshal	Stockade -9
PM	Stockade -10

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SIGNAL OPERATING INSTRUCTIONS

FREQUENCY ALLOCATIONS

Item No. 21-1

EFFECTIVE: 300800U May 1952

1. The specific frequencies allocated and assigned herein are to be used only with the types of emission and maximum power indicated after each frequency.
2. In no case will frequencies between 30.0 and 40.0 MC be used by units of this organization.
3. Radio silence will be observed by all units between H-30 and H-Hour.
4. Frequency Allocations:

<u>FREQUENCY</u>	<u>TYPES OF EMISSION</u>	<u>MAX POWER</u>
40.260 MC	FM	50 W
41.600	FM	50 W
41.200	FM	2 MW

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SIGNAL OPERATING INSTRUCTIONS

TELEPHONE DIRECTORY NAMES

Item 30-1

EFFECTIVE: 300800U May 1952

UNIT

TELEPHONE DIRECTORY NAME

AEC

MERCURY

DR-FORWARD

WOODCHUCK

DR-GF

YUCCA

369 EASR (-)

CACTUS

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Hq Camp Desert Rock
Las Vegas, Nevada
261000U May 1952

ANNEX 7 (Radiological Safety) to Operation Order 8,
Exercise DESERT ROCK IV How

1. Purpose.

The Chemical (Rad-Safe) Section is responsible for coordination of the activities in Camp Desert Rock involving radiological safety during and after an atomic detonation.

2. Mission of Chemical Officer.

a. Chemical Section will:

- (1) Assign monitors to control section.
- (2) Assign monitors and assistant monitors to each bus used by Camp Desert Rock individual participants.
- (3) Immediately upon passing of shock wave, monitors will precede the advancing troops, locate and mark the 1/2 R line.
- (4) Maintain a radiological safety situation map showing the existence and extent of iso-intensity lines at 10 MR, 100 MR, 1 R, and 10 R.
- (5) Monitor all Army and observer personnel assigned to Camp Desert Rock, as well as their vehicles, before departure from Parking Area P.
- (6) Supervise decontamination at the Yucca Pass Decontamination Station.

b. Engineer Section will:

- (1) Establish and maintain Decontamination Station at Yucca Pass for personnel decontamination, having twelve (12) shower points, with suitable pump unit and provide water as required.
- (2) Establish and maintain Decontamination Station at Yucca Pass for vehicle decontamination, providing water, pump units, and hoses for washing contaminated vehicles.

c. Signal Section will:

- (1) Issue in bulk film badges to the following:

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(a) Chemical Section

1 Monitors

2 Officers on duty with Staff of Desert Rock

(b) Visitors Bureau

(c) Units of Camp Desert Rock

(2) Collect exposed film badges with records in duplicate and send to AFSWP film badge processing unit for developing and interpretation.

(3) Provide Radiac Detection Instruments.

d. Quartermaster Section will:

(1) Provide at Yucca Pass Decontamination Station, the following items:

(a) 400 sets of fatigue clothes, tariff sizes.

(b) 400 pairs of boots, combat, tariff sizes.

(c) 20 bars of soap.

e. Transportation Section will:

(1) Provide the following vehicles for use by the Chemical Section.

(a) Two (2) 1/4 ton trucks.

(b) Two (2) 1/4 ton trucks with radio.

(c) Two (2) 3/4 ton trucks.

f. Control Group, Camp Desert Rock will:

(1) Upon completion of duties in the forward area, move to Decontamination Station at Yucca Pass for monitoring and decontamination if required, before returning to Camp Desert Rock.

x. All Personnel:

(1) No individual will be permitted to exceed a maximum tolerance dosage of three (3) roentgens.

(2) No contaminated person or vehicle whose radiation intensity is greater than ten (10) milliroentgens per hour will be permitted to be returned to Camp Desert Rock from the forward area.

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(3) All contaminated persons or vehicles, whose radiation intensity is greater than ten (10) milliroentgens, will be sent to the Decontamination Station at Yucca Pass. At this Decontamination Station, personnel with only skin contamination will be required to scrub thoroughly until the contamination is reduced to background. Personnel, whose clothing cannot be decontaminated to less than ten (10) milliroentgens per hour will be supplied with clean clothing.

(4) All personnel, upon return to Camp Desert Rock, will be required to shower and put on clean clothing. At Camp Desert Rock, personnel will be decontaminated under supervision of unit commanders and CBR personnel to the following maximum limits:

(a) Clothing, 1.5 MR

(b) Skin, 0 MR

(5) Upon return to Camp Desert Rock all contaminated vehicles will be decontaminated to background count. No vehicles or piece of equipment will leave Camp Desert Rock until it has been decontaminated to background count.

(6) A certificate of compliance with the personnel and vehicle decontamination requirements set up in paragraphs 3x(4) and 3x(5) of this Annex will be submitted by commanders of all units and Chief of Visitors Bureau to the Exercise Director, ATTN: Rad-Safe Officer.

(7) The units specified in paragraph 3c(1) of this Annex will issue film badges to all participating personnel no later than 1800 hours on the day prior to the shot day and will record in duplicate on forms provided the film badge number, name rank, serial number, and home station of individual.

(8) The above specified units will collect all film badges before 1800 hours on shot day upon return to Camp Desert Rock. Film badges with appropriate records in duplicate will be turned in to Signal Officer, Camp Desert Rock, prior to 2000 hours on shot day.

(9) All units and participating personnel will comply with the instructions and provisions contained in the Radiological SOP, Camp Desert Rock.

(10) All personnel going to forward area on shot day will carry a gas mask.

(11) Film badges will be worn with the green tab turned toward the body.

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4. Administration.

a. See current Administrative Directive.

5. Communications.

a. The Radiological Safety Officer will have a telephone in the control trench listed as Rad-Safe.

b. The Radiological Safety Officer and his assistant will be furnished a radio jeep in order to transmit preliminary intensity survey data to the Rad-Safe Officer.

c. See Annex 6 (Signal).

Appendix A - Special Rad-Safe
Survey for Tactical
Units

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APPENDIX A (Special Rad-Safe Survey for Tactical Unit)
to Annex 7 (Radiological Safety) to Operations
Order No. 8

1. Two Rad-Safe Survey Teams will be designated to complete a radiological survey along the pre-determined route of advance of the tactical troops. The direction and the extent of forward movement of tactical troops will be based on the intensities located by these teams. Appendix A to Annex 3 shows the location of all RJ referred to below.
2. Each team will be composed of two selected officers and sufficient enlisted men to monitor all areas and stake routes of advance.
3. Each team will be provided a 1/4 and 3/4 ton vehicle.
4. Each team will be equipped with the following communication facilities:
 - a. One (1) VRC2 HF radio permanently mounted on a 1/4 Ton Military Police vehicle.
 - b. One (1) SCR 300 radio.
 - c. One (1) EBBA telephone.
5. Team No. 1 will be the responsible team throughout the survey for the prompt reporting of intensities to the CP. Team No. 1 itinerary is as follows:
 - a. Locate at Parking Area N until shot time.
 - b. After shot, move north via RJ-22 to RJ-26.
 - c. Move east from RJ-26 to meet Team No. 2; return to RJ-26 and report intensities found by radio or telephone to CP.
 - d. If intensity is less than 500 MR, continue north from RJ-26 to RJ-27 and east to Contact Team No. 2.
 - e. Return to RJ-27 and report any intensities to the CP by telephone or radio.
 - f. If 500 MR intensity has not been reached, continue north across country toward ground zero until 1/2 R area is reached. Report finding to CP.
 - g. Move west following the 500 MR intensity to lateral road between RJ-23 and ground zero. The path taken will be the route of advance of the tactical troops and will be marked by red flags and white tape.

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h. Return to RJ-27 via RJ-3 to meet Commanding General with complete survey report.

6. Team No. 2 will conduct survey along the east portion of the route of advance, reporting all intensities found to Team No. 1 and the CP. Their itinerary is as follows:

a. Locate at Parking Area O to RJ-21 north to RJ-25.

b. Move from RJ-25 west to meet Team No. 1. Report any intensities found to Team No. 1, return to RJ-25.

c. If the intensity is less than 500 MR, continue north from RJ-25 to RJ-8 and west to join Team No. 1. Report any intensities to Team No. 1. Return to RJ-8.

d. If the 500 MR intensity has not been reached continue north from RJ-8 toward ground zero to locate the 1/2 R intensity. Report findings to Team No. 1.

e. Move west following 500 MR intensity to join Team No. 1.

f. The path taken will be marked by red flags and white tape and will be the route of advance for the eastern column of the tactical troops.

g. Under direction of Team No. 1, survey Parking Area P and C.

h. Meet Team No. 1 at RJ-27 for conference with CG.

i. The survey will continue north along the lateral road to the 10 R line.

7. If the results of the survey show a 500 MR intensity to be found south of RJ-26-25, troops may be turned northwest on the road connecting RJ-33-RJ-31-RJ-7, and the road connecting RJ-32-RJ-26-RJ-27. Further advance to be determined by intensities farther north along these roads and on order of the CG. Team No. 1 will be responsible for stopping the columns at RJ-33-32 and conducting the required survey to RJ-7 and RJ-27. Reports will be made to the CP.

8. If the 500 MR intensity is found to be south of the road connecting RJ-27-RJ-8, troops may use the lateral roads RJ-26-RJ-7 and RJ-25-RJ-27. Further advance will be dependent on further survey along these roads and on order of the CG. Team No. 1 will be responsible to halt the advancing columns at RJ-25-26 and conducting the survey to RJ-7 and RJ-27. Reports will be made to the CP.

9. There will be no movement into an area of greater than 500 MR intensity unless directed by the Commanding General.

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10. Two (2) selected monitors with T1B instruments and pocket dosimeters will accompany the OIC of each advancing column to keep him informed of contamination intensity and dosage received.

11. See Annex 9 (Evacuation Plan).

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Hq Camp Desert Rock
Las Vegas, Nevada
261000U May 1952

ANNEX 8 (Medical) to Operation Order 8
Exercise DESERT ROCK IV How

1. Mission.

Camp Desert Rock Dispensary will furnish medical support for all personnel participating in Exercise DESERT ROCK IV How. Camp Desert Rock Dispensary will provide for evacuation and the initial reporting of deceased personnel resulting from Exercise DESERT ROCK IV How.

2. Operation.

a. A Medical Detachment consisting of one medical officer, one chaplain and three aidmen with one ambulance will move with the Observer Group (See Annex 3) and upon arrival in the forward area will operate as an aid station, at Parking Area M. Ambulance will stand by to be used for evacuation as needed. This ambulance will remain in the forward area and return to Camp Desert Rock with the Observer Group convoy.

b. Three aidmen with one ambulance will move with each of the two units of the 369 EASR (-). One chaplain will be attached to the second unit ambulance. These ambulances and personnel will stay with the convoy at all times except for emergency evacuation, and return to Camp Desert Rock with their assigned unit convoy.

3. Evacuation of Ill and Injured:

a. Personnel having minor injuries or sickness will be treated at the Aid Station and returned to duty or evacuated to the Dispensary at Camp Desert Rock.

b. Serious casualties, requiring hospitalization will be given first aid and transferred to non-field ambulance at Camp Desert Rock for evacuation to Nellis Air Force Hospital, Nellis Air Force Base, Las Vegas, Nevada.

c. In emergency cases requiring mass evacuation, the litter busses will be used.

d. Route of motor vehicle evacuation: AEC Access Road to Camp Desert Rock, Southeast on Highway 95 to Nellis Air Force Base, Las Vegas, Nevada.

4. Evacuation and Reporting of Deceased.

a. Deceased personnel will be collected by members of the Medical Detachment.

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b. A medical officer will certify the death and direct evacuation by use of ambulance or other vehicle.

c. The medical personnel will, by phone or radio, at the earliest possible moment, make an initial report of death to the Commanding General at the Control Group. He will report the name, rank, serial number, organization and cause of death when making this report.

d. The Adjutant at the Control Group will phone the report of deceased to the Adjutant, Camp Desert Rock. The Adjutant, Camp Desert Rock will make appropriate notification to D/A and family in accordance with established regulations.

e. Evacuation of deceased will be by ambulance or other vehicle direct to Bunker Brothers Mortuary, 5th and Stewart, Las Vegas, Nevada for cold storage pending decision for performance of an autopsy.

f. Upon receipt of report of death at Camp Desert Rock, the Adjutant will inform the P and C Officer who will immediately proceed to the Mortuary in Las Vegas.

g. The P and C Officer will remove all personal effects from the body of the deceased and turn them over to an appropriate Summary Court Officer.

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Hq Camp Desert Rock
Las Vegas, Nevada
261000U May 1952

ANNEX 9 (Emergency Evacuation Plan) to Operation Order 8
Exercise DESERT ROCK IV How

1. This Annex outlines the procedure to be followed to accomplish the total evacuation of the forward area during Exercise DESERT ROCK IV How. The Commanding General, through the Control Group Commander, will direct the implementation of this plan.

2. Personnel listed in Annex 3 will be prepared to execute a total evacuation of the forward area at any time during H-Day.

a. The direction of the evacuation will be to the south to Camp Desert Rock or designated place of safety to the north through the forward area beyond the danger area as directed.

b. Group Commanders as listed in Task Organization, Operation Order 8 will be responsible for the movement of their vehicles in the proper direction of evacuation and that the vehicles remain in proper serial order.

c. When personnel are detrucked in the entrenchment area the procedure will be as follows:

(1) Group Commanders will assemble and muster their personnel at loading area.

(2) Vehicles will be dispatched from parking areas in serial order, to the loading areas, and loaded.

(3) Move on order to place of safety designated.

d. When Regt is advancing on Objective Green:

(1) Vehicles will move at a slow pace closely behind the tail of the march column.

(2) Commanding Officer will assemble and muster personnel and load transportation.

(3) Move by most expedient route to place of safety designated.

e. When personnel are detrucked in the vicinity of Ground Zero the procedure will be as follows:

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(1) Group Commanders will assemble and muster their personnel along the nearest edge of the road to ground zero and await vehicles or move to Parking Area P as directed by the Group Commander.

(2) Vehicles will be dispatched from Parking Area P as directed by the Control Group Commander to pick up personnel along the road to ground zero. Vehicles will remain in march units as serial groups.

(3) Move on order to place of safety designated.

f. When personnel are loaded in transportation, convoy will proceed in regular order in direction indicated.

g. The Control Group will evacuate the test area on order of the Exercise Director when it is assured that all other groups have been evacuated in the proper direction.

h. The Control Group Commander will insure that all vehicles arrive at the point designated, if the evacuation is to the north, or clear through Check Gate 2 and 1 if the evacuation is to the south toward Camp Desert Rock.

x. (1) Maximum vehicle road speed will be as indicated in Annex 2 unless otherwise directed.

(2) Vehicle serials will remain intact during all movements.

(3) Command, MP, and Medical vehicles will have road priority during the evacuation movement.

(4) Code designation for Evacuation Plan will be "CONDITION BLACK."

(5) "CONDITION BLACK" will be transmitted by most available means and will be authenticated by Camp Desert Rock Rad-Safe Officer.

"CONDITION BLACK" will be transmitted to Column Commanders leading columns of troops, by radio. When "CONDITION BLACK" is received by Column Commanders, this information will immediately be transmitted to the Tank Commanders who will immediately cause the tank siren to operate for a period of one minute.

(6) Upon receipt of "CONDITION BLACK," Group Commanders will order all personnel to put on gas masks. When "CONDITION BLACK" has been set all personnel will wear gas masks until ordered to remove them by the Control Group Commander.

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4. Medical Evacuation.

a. Aid Stations in the test site area will cease operations upon the evacuation of all personnel from the forward area and join the Control Group Serial.

b. Casualties will be evacuated to Medical Detachment at Camp Desert Rock if the evacuation is to the south or to a temporary aid station, which will be set up, if the evacuation is to the north.

c. Route of evacuation will be the most direct route available.

5. Miscellaneous.

a. Emergency Signal: Red Star Cluster.

b. Forward CP will move from entrenchment area and/or equipment area upon receipt of "CONDITION BLACK." New location to be announced at time of movement.

OFFICIAL:

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Brig Gen

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ANNEX III - PSYCHOLOGICAL

PSYCHOLOGICAL FINDINGS

Distribution of complete findings on Psychological Reactions will be made by the Human Resources Research Office and the Operations Research Office, to all addressees, when completed.

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ANNEX IV - FISCAL

FISCAL

Distribution of a complete Fiscal Report will be made by Sixth Army Comptroller, only to Headquarters requiring the information, as soon as all vouchers and claims against the exercise have been received.

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ANNEX V - DAMAGE EFFECTS

SUMMARY OF SHOTS

1. This Annex contains factual data on damage effects sustained by vehicles, weapons, clothing, equipment, and live animals; unprotected and in field type emplacements, as produced by Shots Three, Four, Six, and Eight of varying KT yields.

2. No troop participation or Armed Forces damage effects tests in Shots One, Two, Five, and Seven.

3.	<u>NO.</u>	<u>DATE</u>	<u>TIME</u>	<u>KTY</u>	<u>MEANS</u>	<u>HEIGHT</u>	<u>TROOP</u> <u>P'TN</u>	<u>PAGE</u>
	3	22 Apr	0930	30	Air Drop	3500'	Army-AF	92
	4	1 May	0930	22	Air Drop	1050'	Marine	140
	6	25 May	0500	14	Tower	300'	Army	144
	8	1 Jun	0455	17	Tower	300'	Army	194

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ANNEX V - DAMAGE EFFECTS - EXERCISE DESERT ROCK IV C

SHOT NUMBER THREE

Test materiel and equipment for this exercise was placed both above and below the surface of the ground at distances varying from 200 to 3500 yards from ground zero. Positions used were on a line running a little north of west from the blast.

Generally materiel nearest ground zero showed greater blast but less thermal effect than that placed at greater distances from the detonation. Most severe thermal effects on materiel were noted in the vicinity of 900 yards from the blast. While flesh and skin burns would have been deeper nearest ground zero, third degree skin burns would have been experienced by personnel outside foxholes up to 1700 yards. Fires were ignited in grass and yucca plants at 3500 yards, and a field telephone wire storage building at this distance was ignited and completely destroyed. (See Photo Page 98).

Gamma radiation in a lethal dosage was experienced by a sheep in a foxhole four feet deep 550 yards from ground zero. A sheep in foxhole at 900 yards suffered no visible radiation effect. The sheep on ground surface at 900 yards was so severely burned that determination could not be made with reference to radiation sickness.

A noteworthy verification of a previous finding in connection with the display of vehicles was the fact that partly filled gasoline tanks neither exploded nor were ignited from the thermal effect of the blast. In some vehicles seat cushions and canvas tops were destroyed by fire, but fuel was still available for operation of vehicles if they were not otherwise made inoperable. Distances of vehicles from ground zero varied from 200 to 3500 yards.

Detailed descriptions and pictures of damage effects will be found in the following pages.

EXERCISE DESERT HOCK IV C

EQUIPMENT DAMAGE EFFECTS

22 April 1952 0930 Hours

Weather: Clear, warm
Wind: Very light from South

Type of Delivery - Air Drop
Approx Height of Burst - 3500'
Approx KT Yield - 30

Items of Display	200 Yards	550 Yards	900 Yards	1700 Yards	3500 Yards
Truck, 2 1/2 Ton	Paint charred facing explosion, broken glass from right window blown out. Gasoline not ignited.	Paint charred facing explosion, broken glass from right window blown out. Gasoline not ignited.	Interior including dashboard & seats severely scorched, windshield blown out. Glass found 30 yds from vehicle, paint and tires facing blast blackened from burn. Suction opened hood. Gasoline not ignited. Vehicle operable.	Vehicle moved No visible about 2' away effect. from blast. Bag in vehicle burned, paint blackened. Vehicle operable.	Windshield smashed, exposed portions of truck scorched. Vehicle operable. Glass shattered.
Truck, 1 1/4 Ton	Windshield broken, thin skin pressed down at all but heavily reinforced areas, seat cushion burned and smashed flat, components of motor burned and pressed down, gasoline not ignited. Vehicle not operable.	Top smashed down, point scorched facing explosion, windshield spring forward. Glass not broken. Rear wheels moved 5' away from blast. Gasoline not ignited. Vehicle operable.	Interior including dashboard & seats severely scorched, windshield blown out. Glass found 30 yds from vehicle, paint and tires facing blast blackened from burn. Suction opened hood. Gasoline not ignited. Vehicle operable.	Vehicle moved No visible about 2' away effect. from blast. Bag in vehicle burned, paint blackened. Vehicle operable.	Windshield smashed, exposed portions of truck scorched. Vehicle operable. Glass shattered.
Tank Medium	Paint on blast side blackened, treads blackened, otherwise no visible damage from blast or heat.	Sandbag burned and burst, gun blackened but operable.	Paint facing burst blackened, antenna bent, shield for left idler wheel blown off. Vehicle completely operable.	Sandbags burned and split, gun slightly scorched but operable.	Sandbags burned and split, gun slightly scorched but operable.
.30 Cal Hwy MG		Sandbag burned and burst, gun blackened but operable.	Sand bags burned and burst, gun blackened but operable.	Sandbags burned and split, gun slightly scorched but operable.	Sandbags slightly scorched gun undamaged.

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Items of Display	200 Yards	550 Yards	900 Yards	1700 Yards	3500 Yards
30 Gal Lt MG	Sandbags burned. Contents displaced, gun blackened but operable. Pit 1/3 filled with sand.	Sandbags burned and burst, gun blackened but operable.	Sandbags burned and burst, gun blackened but operable.	Sandbags burned and burst, gun blackened but operable. Blast effect was a little less severe on sandbags.	
Covered 0 P 4x4" board & sandbags	Sandbags burned and split, top moved 3' and pushed in pit 3/4 filled with sand	Sandbags burned and split. Exposed wood charred, two planks loosened and forced into pit. Excess sand also in pit.		Sandbags burned and split	Sandbags scorched but not split.
2 man Foxhole (Revetted)	Sandbags burned and split. Walls partially caved in.	Sandbags burned and split. Sides caved in to a lesser degree than at 200 yds.	Sandbags burned and split. Very little damage to walls from blast.	Sandbags burned and split. Slight scorching but cave in of sides due to loose sandy soil.	Sandbags scorched but not split. No other visible effects.
12 Drop Switch-board (Below Ground)		Instructions burned off, top of board slightly charred. May have become inoperable due to burned insulation or melted solder connections.			
105-mm Howitzer (Emplaced)		Sandbags burned and split. Surface of gun blackened but weapon still operable.	Sandbags burned and split. Lubrication on exposed surface burned and gummed, paint scorched, completely operable.		
60-mm Mortar (Emplaced in Foxhole)		Sandbags burned and split. Weapon blackened but completely operable.		Sandbags burned and split. Weapon on undamaged.	Sandbags scorched. No damage to weapon.

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Items of Display	200 Yards	550 Yards	900 Yards	1700 Yards	3500 Yards
Rifle M-1 on surface	Stock slightly charred but operable.	Stock scorched. Weapon completely operable.			
Gas Mask in foxhole	No visible sign of damage.	No visible sign of damage.	Mask covered with dirt otherwise undamaged.		
Dummy in foxhole (Herring-bone fatigue)	Appeared to have suffered extreme blast effect. Clothing ignited and blown out by blast.	Helmet slightly scorched, otherwise undamaged.	Partially covered with dirt from collapsed wall.		
Dummy on Surface (Herringbone twill fatigues)	Burned and part of clothing blown off by blast.	Completely dismembered by heat and blast. Most severe effects to any dummy.	Burned and blown apart worse than 550 yds but less than at 900 yds.		
SCR - 300 Radio (Below Ground)		End sections of aerial disjunct but not broken. Radio still operable.	Undamaged.		
Sheep above ground (Freshly sheared)	Blinded, 3rd degree burns over most of body. Dazed from blast and shock. Would have died from burns. Anaesthetized.	Cage overturned and rolled 25 yds by blast. Sheep escaped and was found 3 days later w/3rd degree burns but still able to stand. Sent to laboratory for analysis of radiation.	Wool on side facing blast was severely scorched, otherwise in good condition. Survived the test.		
Sheep 4' below ground (Freshly sheared)	Some 3rd degree burns on sheep's back and ears. Sent to laboratory due to radiation sickness after 3 days.	1st degree burns on right ear and right side of head. Survived radiation, burn, and blast effects.	Appeared shaken and had a running nose. Survived radiation, burn, and blast effects.		

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Items of Display General	200 Yards	570 Yards	900 Yards	1700 Yards	3500 Yards
		Vegetation burned throughout display area. Light crust formed on soil probably due to fusion of sand by heat.	Vegetation scorched and blackened, cloth such as bur-lap clothing and tarpaulins completely burned.	Vegetation and blackened. Clothing burned.	Vegetation set on fire. See house filled with field phone wire ignited. Phone cable destroyed by burning.
Residual Radiation	No Reading.	Approx 30-40 Milliroentgens per hr, 1 1/2 hrs after detonation.	Approx 12-15 MR per hr, 1 1/2 hrs after detonation.	Approx 3 MR per hr 2 hrs after detonation.	

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PRELIMINARY REPORT ON SHEEP EXPOSED
in

A-BOMB BLAST - 22 APRIL 1952

SHOT NUMBER THREE

Sheep Nos. 8 and 10 were exposed to an atomic explosion on 22 April 1952. No. 8 was in an exposed position 900 yards from ground zero and died at 1000 hours 27 April, while No. 10 was in a foxhole 500 yards from ground zero and died during the night of 27-28 April.

Except for the distribution of second and third degree thermal burns the gross autopsy findings were essentially the same. No. 10 which was protected in a foxhole received burns over the head and withers while No. 8 which was in an exposed position was burned about the belly and flanks. Both showed little in the way of other gross findings except for petechial hemorrhages in the lungs and heart. In neither case was the extent of thermal burns considered to be sufficient to have been a primary cause of death.

The pertinent preliminary histologic findings are limited to the hematopoietic and lymphopoietic systems. The bone marrow picture varies from complete wiping out of the blood forming tissue to one showing some islands of reticulum cells with a few associated mature myeloid elements but with no evidence of regenerative activity. There are also scattered megakaryocytes which show degeneration as evidenced by karyolysis and pyknosis of the nuclei. The lymph nodes show no active germinal centers, the sinusoids are dilated, there is degeneration as evidenced by scattered nuclear debris and cells with pyknotic nuclei, and the type cell both within the sinusoids and in the supporting tissue is a large mononuclear cell. These latter cells occasionally show mitosis indicating that the regenerative powers of this type of cell which is presumably derived from reticulum cells, is not completely destroyed.

Both animals died before peripheral blood studies could be performed; however, as judged by the study of sections there was a severe leukopenia.

The findings are those usually associated with death due to radiation injury, but are not necessarily specific for this type of injury.

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ANNEX V - DAMAGE EFFECTS - EXERCISE DESERT ROCK IV C

The following photographs of materiel taken before and after the third Atomic explosion in the TUMBLER/SNAPPER series reveals damage effects at varying distances from ground zero.

Series A - 200 yards from ground zero.

Series B - 550 yards from ground zero.

Series C - 900 yards from ground zero.

Series D - 1700 yards from ground zero.

Series E - 3500 yards from ground zero.

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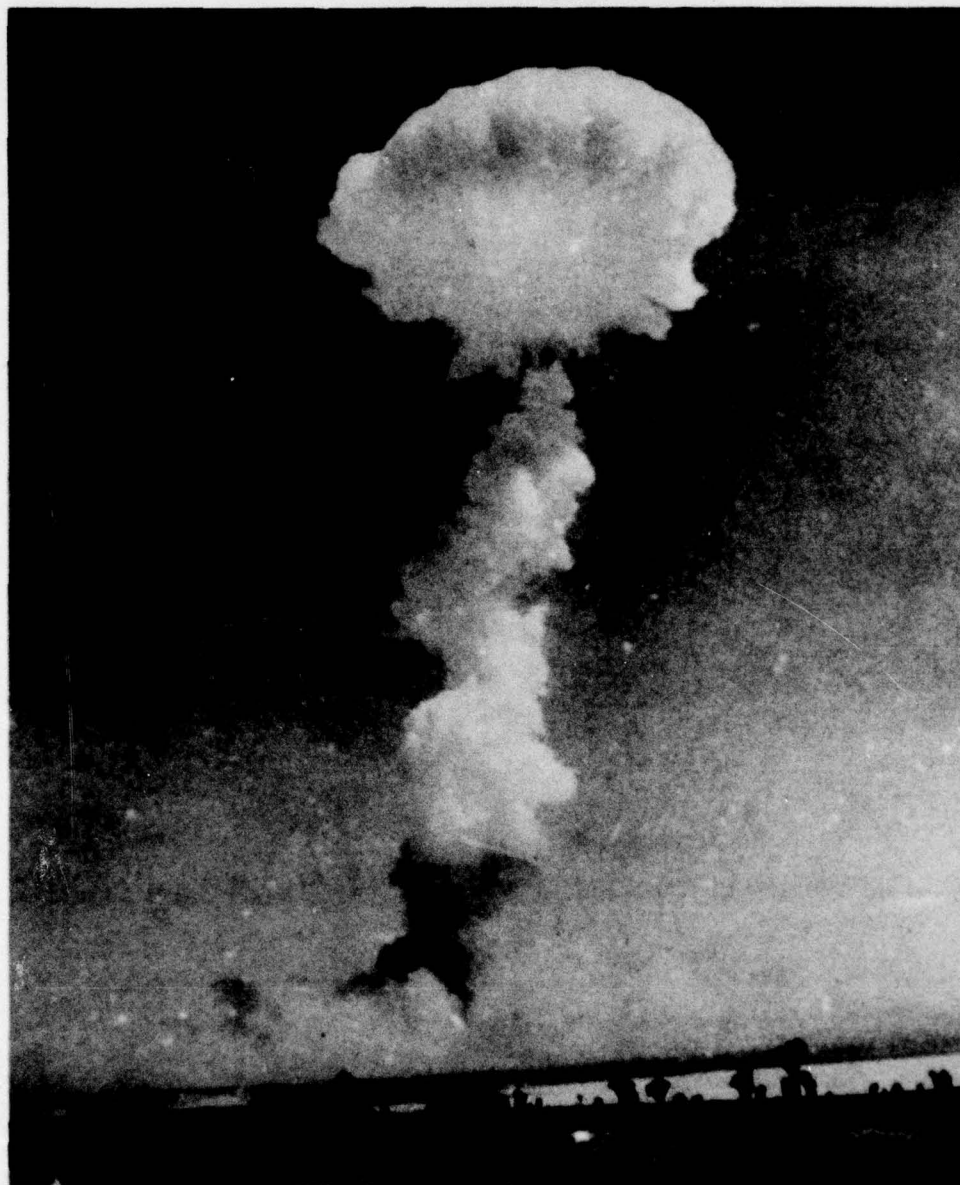
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Wooden Building Housing Field Wire
Two Miles From Ground Zero

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Shot 3 - Note Doughnut Shape of Fireball.

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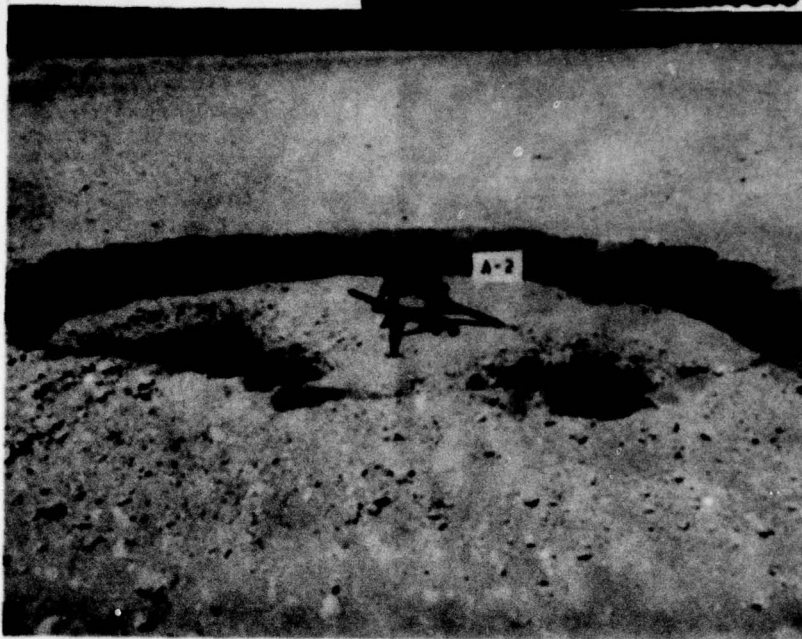


Shot 3 - Forming a Mushroom Cloud.
Observers are 7000 yards
from Ground Zero.

[REDACTED]
[REDACTED]
UNCLASSIFIED

BEFORE

.30 Cal. Machine Gun
Light 200 yards from
ground zero



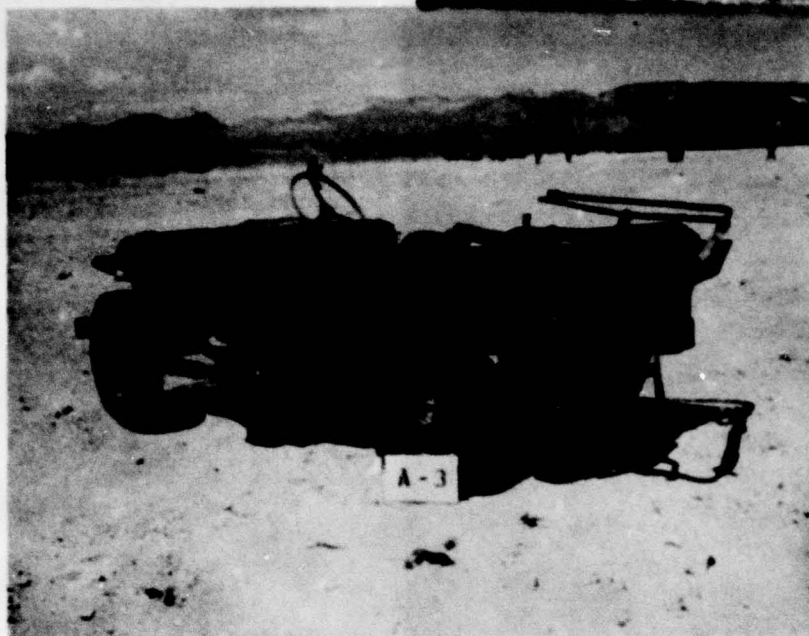
AFTER

Sandbags burned.
Gun scorched but
operable.



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[REDACTED]
[REDACTED]

UNCLASSIFIED

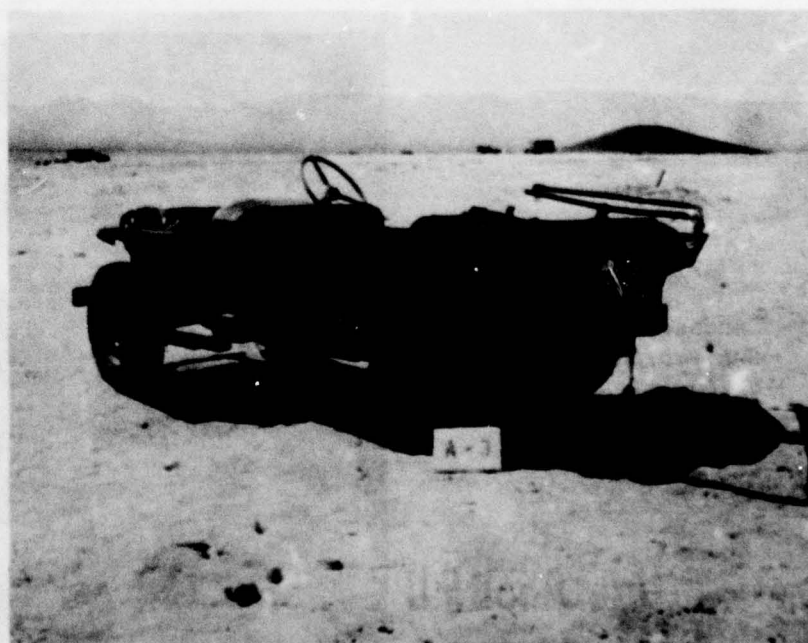


BEFORE

Truck 1/4 Ton.
200 yards from
ground zero.
Vehicle partial-
ly damaged from
previous detona-
tion.

AFTER

Motor wiring burn-
ed. Gasoline did
not ignite. Not
operable.



[REDACTED]
[REDACTED]
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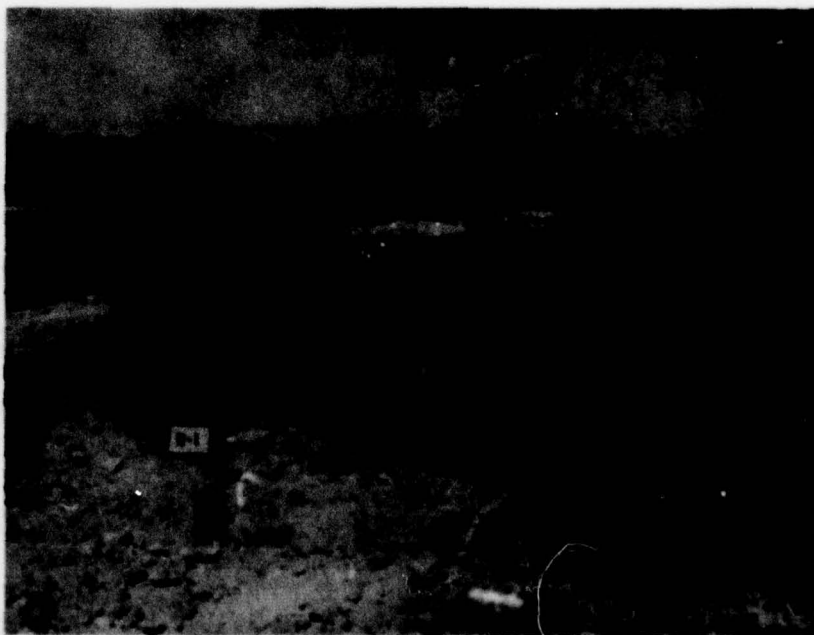


BEFORE

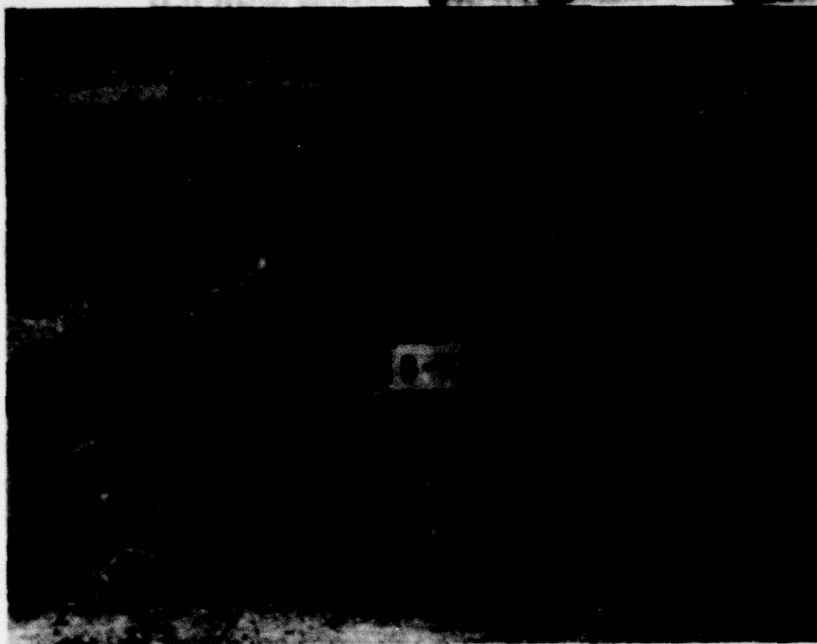
105-mm Howitzer.
550 yards from
ground zero.

AFTER

Shield bent. Paint
scorched. Sandbags
burned. Gun oper-
able.

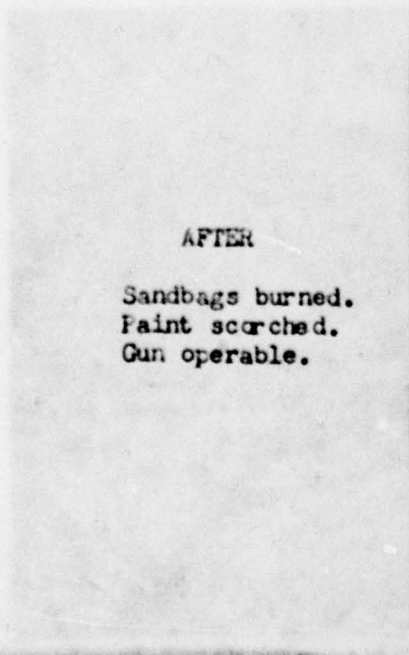


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[REDACTED]
[REDACTED]



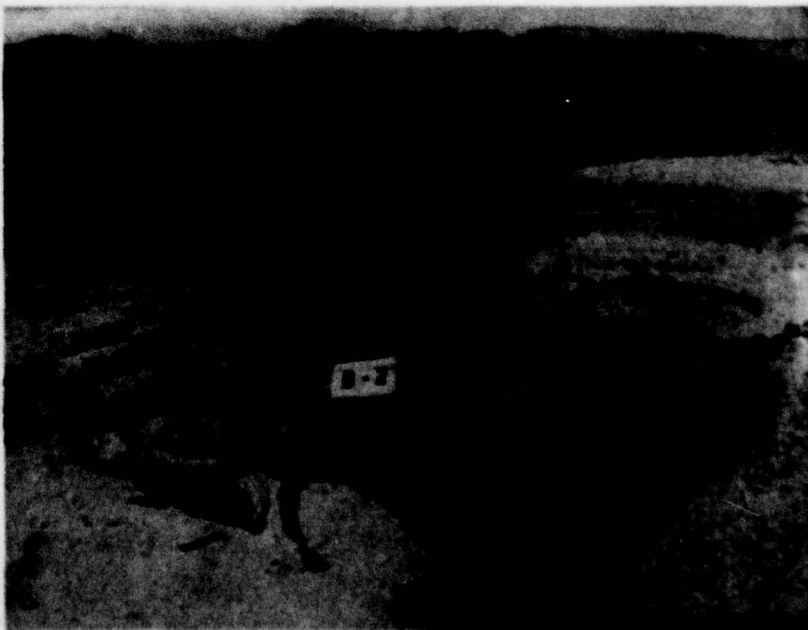
BEFORE

.30 Cal. Machine Gun
Heavy. 550 yards
from ground zero.



AFTER

Sandbags burned.
Paint scorched.
Gun operable.



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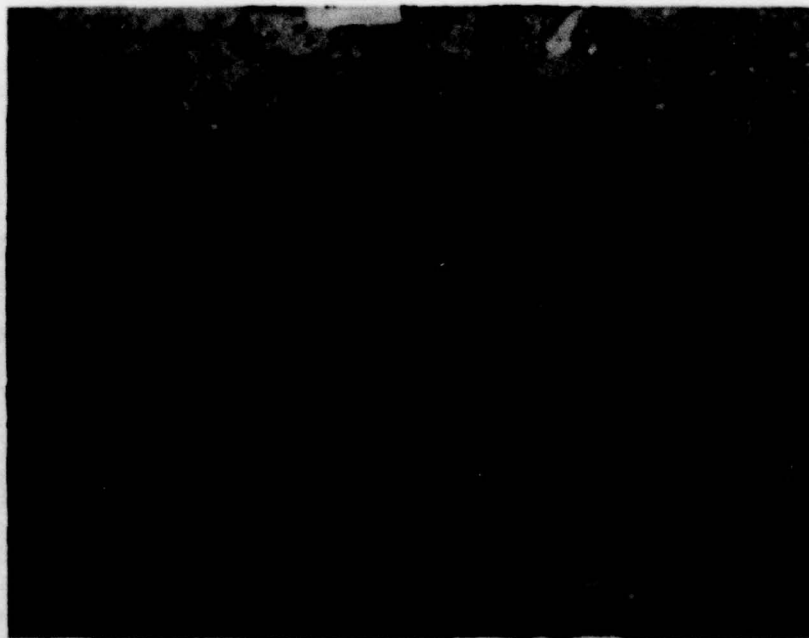


BEFORE

12 Drop Switchboard.
Emplaced 550 yards
from ground zero.

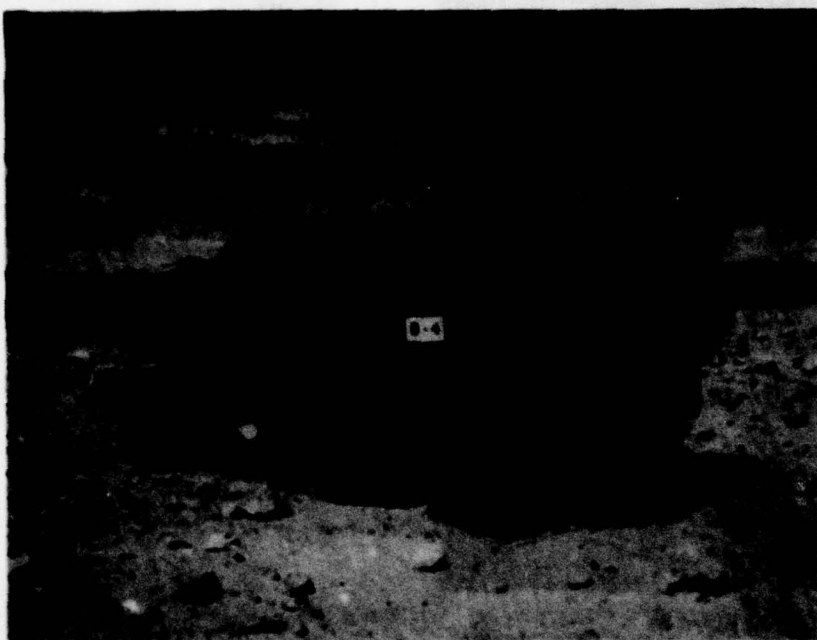
AFTER

Severely scorched.
Inoperable due to
insulation burning
and melted solder.



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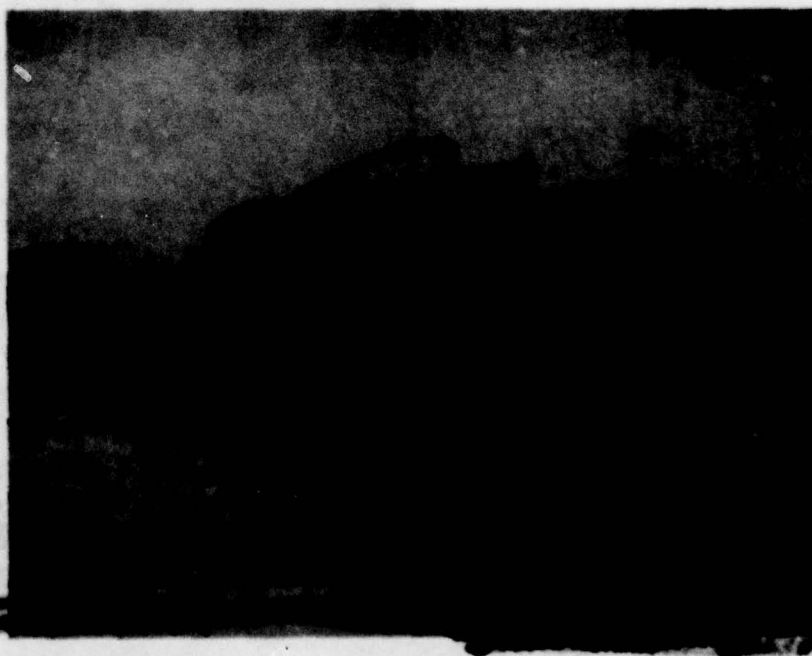


BEFORE

Truck 2 1/2 Ton.
550 yards from
ground zero. Ve-
hicle damaged
from previous
detonation.

AFTER

Paint scorched.
Glass broken.
Gasoline did not
ignite. Truck
operable.



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[REDACTED]
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BEFORE

60-mm Mortar. Em-
placed 550 yards
from ground zero.

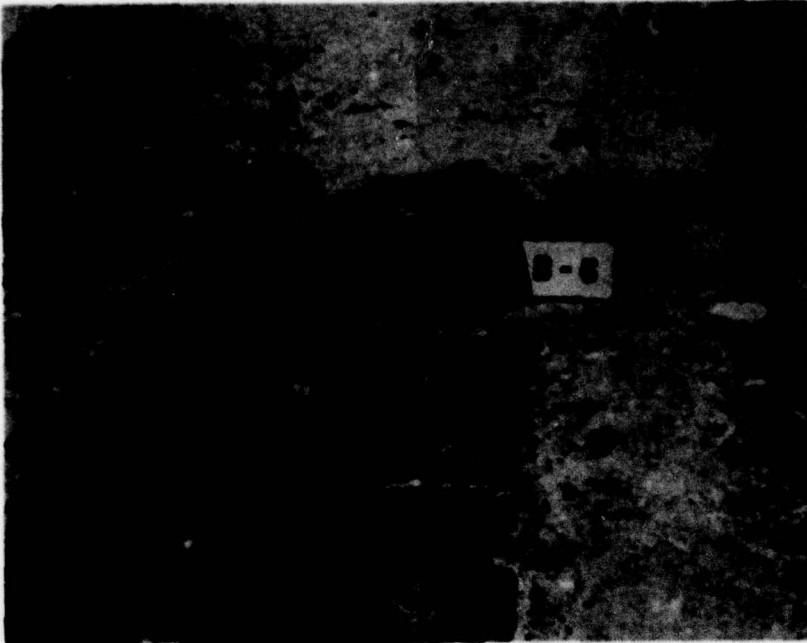
AFTER

Paint scorched. Com-
pletely operable.



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[REDACTED]
[REDACTED]

UNCLASSIFIED

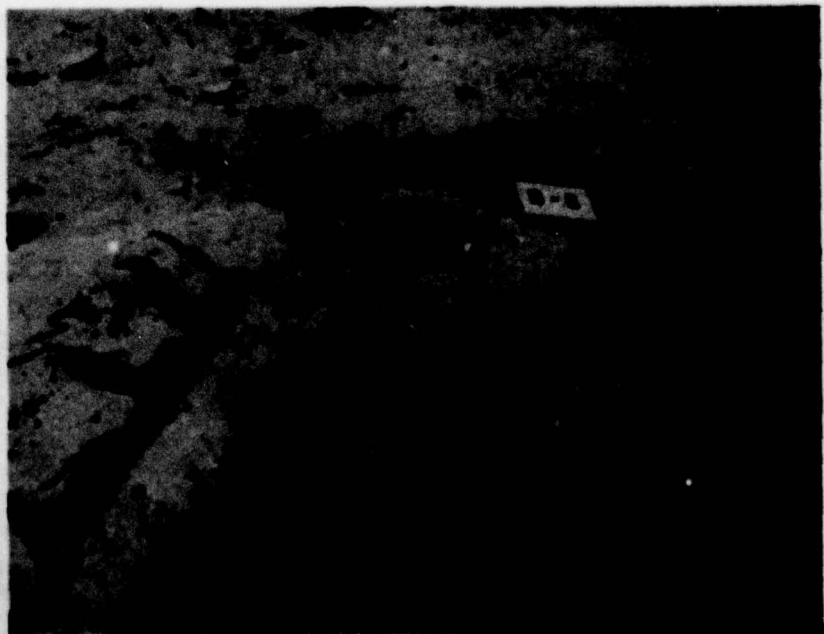


BEFORE

Dummy above and below ground. (Herringbone twill Fatigues). 550 yards from ground zero.

AFTER

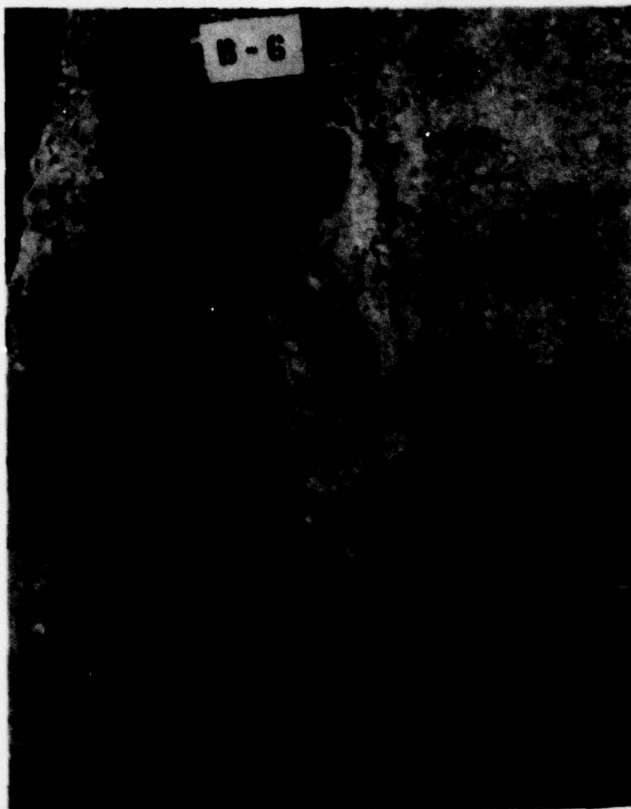
Above ground severely burned and blasted. Below ground damaged severely by blast.



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BEFORE

Dummy below ground.
(Herringbone twill
Fatigues). 550
yards from ground zero.



AFTER

Close-up showing
extreme blast dam-
age. Dummy
partially covered
with dirt.

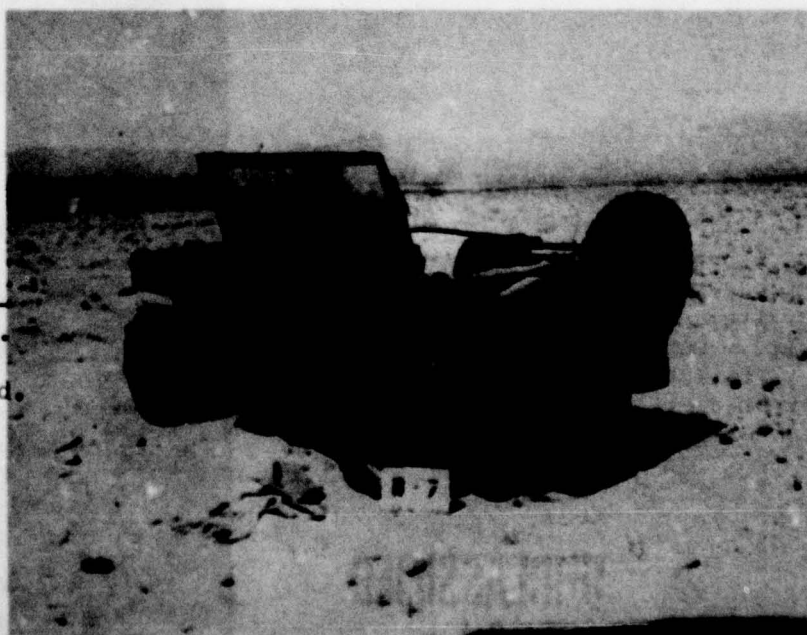


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BEFORE

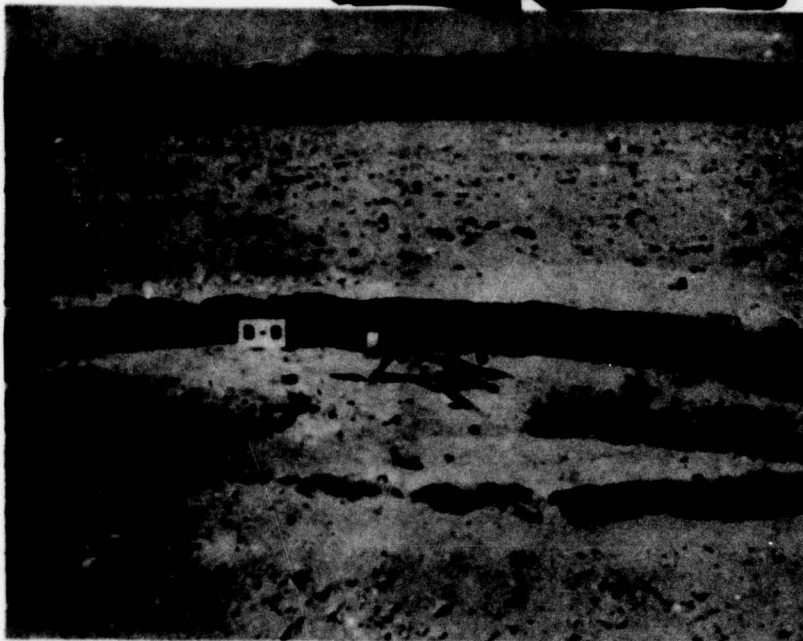
Truck 1/4 Ton.
Faced away from
detonation. 550
yards from
ground zero.



AFTER

Paint charred. Wind-
shield bent forward.
Glass not broken.
Gasoline not ignited.
Vehicle operable.

[REDACTED]
[REDACTED]
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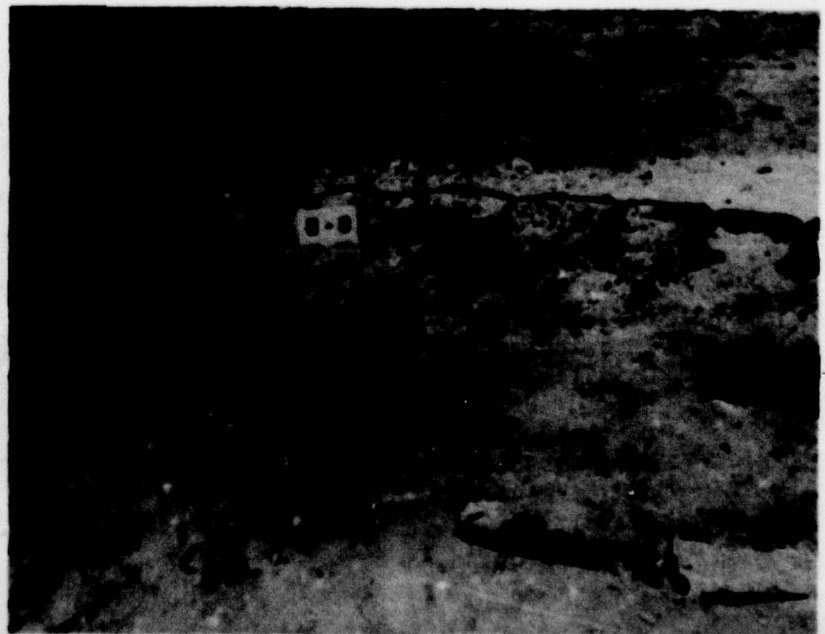


BEFORE

.30 Cal. Machine
Gun Light. 550
yards from ground
zero.

AFTER

Sandbags burned.
Paint scorched.
Gun operable.

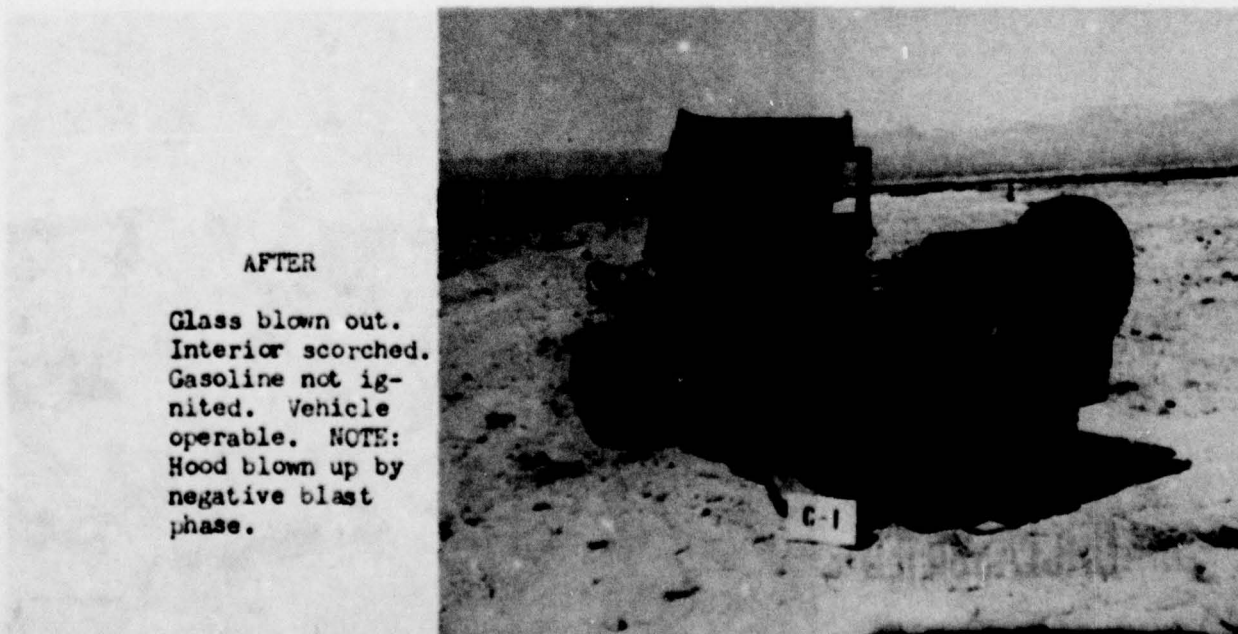


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[REDACTED]
[REDACTED]



BEFORE

Truck 1/4 Ton.
Faced away from
detonation 900
yards from
ground zero.

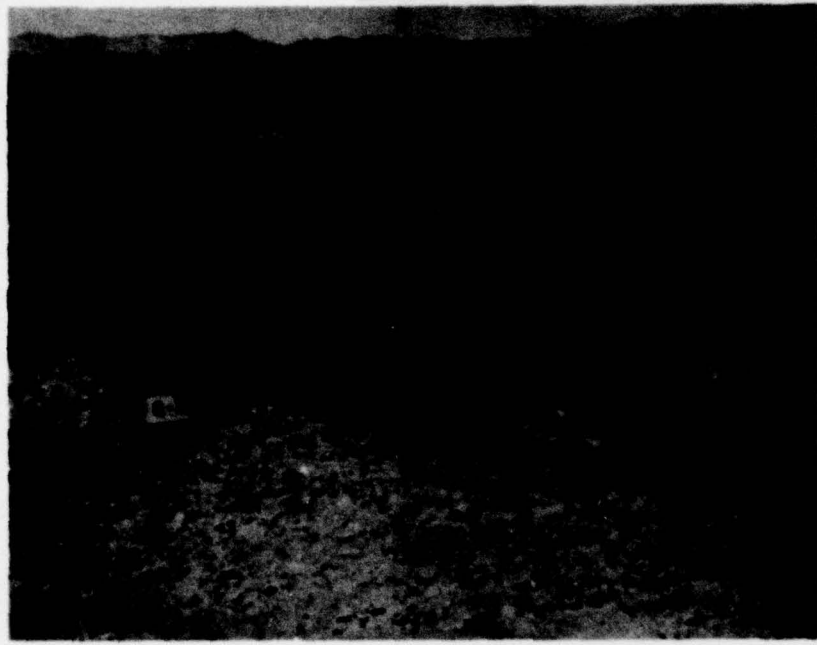


AFTER

Glass blown out.
Interior scorched.
Gasoline not ig-
nited. Vehicle
operable. NOTE:
Hood blown up by
negative blast
phase.

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~~SECRET~~

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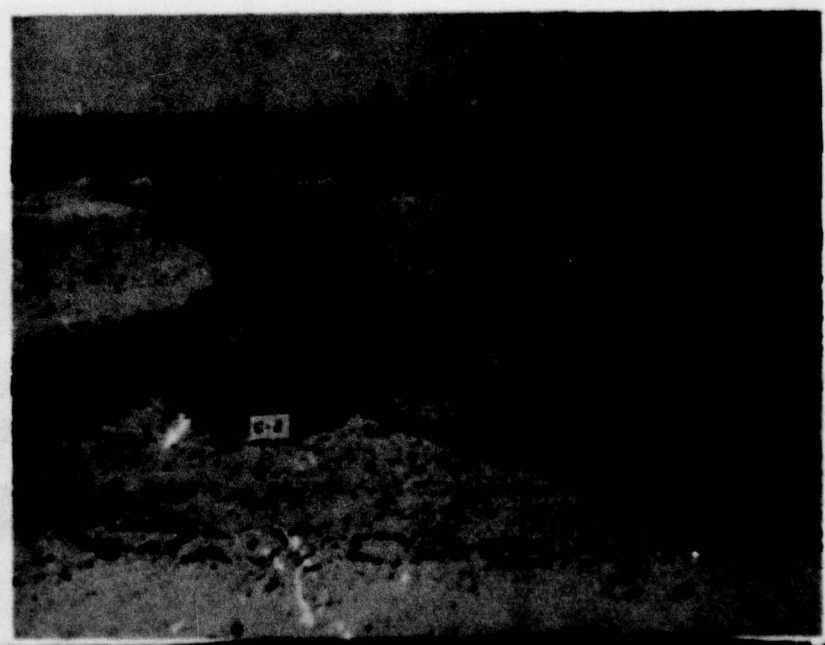


BEFORE

105-mm Howitzer
900 yards from
ground zero.

AFTER

Paint scorched.
Lubricants
burned and gum-
med. Completely
operable.



UNCLASSIFIED

~~TOP SECRET~~
~~SECRET~~

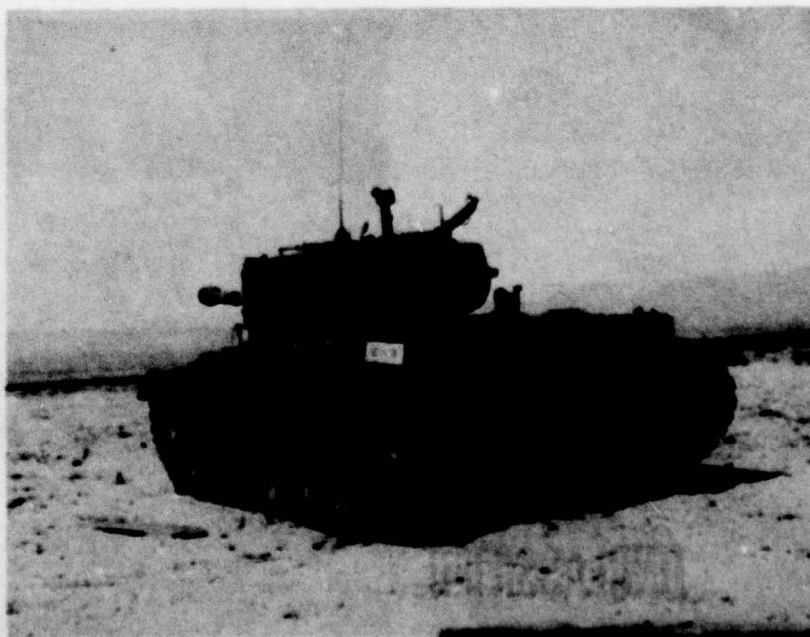


BEFORE

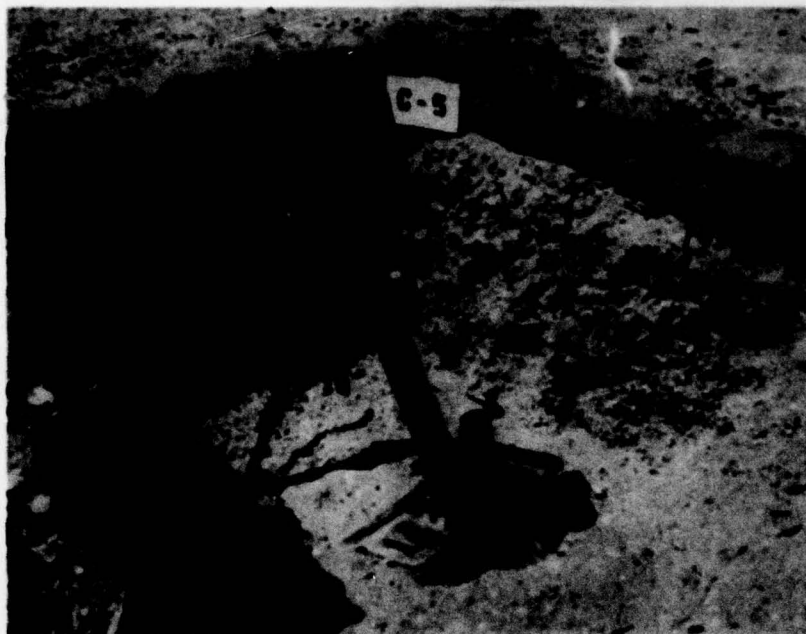
Tank, Medium.
900 yards from
ground zero.
Faced away from
detonation.

AFTER

Paint scorched.
Antenna bent.
Shield for left
idler wheel
blown off. Com-
pletely operable.



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BEFORE

81-mm Mortar. Em-
placed 900 yards
from ground zero.

AFTER

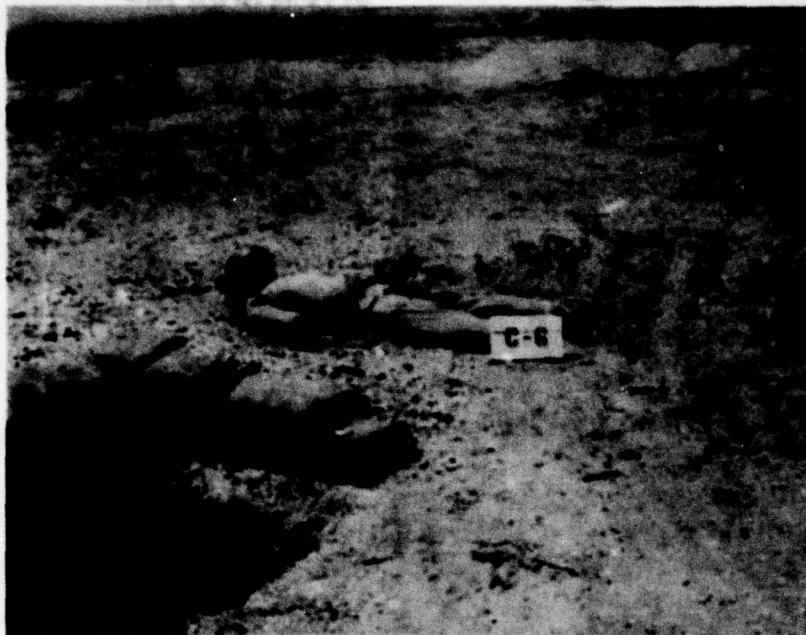
Paint scorched.
Completely
operable.



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BEFORE

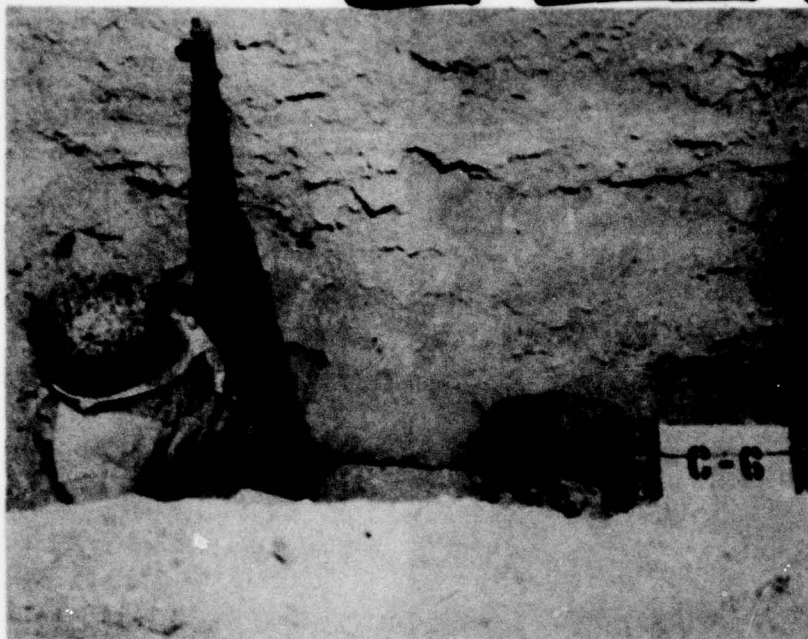
Dummy above ground.
(Herringbone twill
Fatigues) 900 yards
from ground zero.

AFTER

Completely burned
and blasted away.
Most severe damage
of any dummy.



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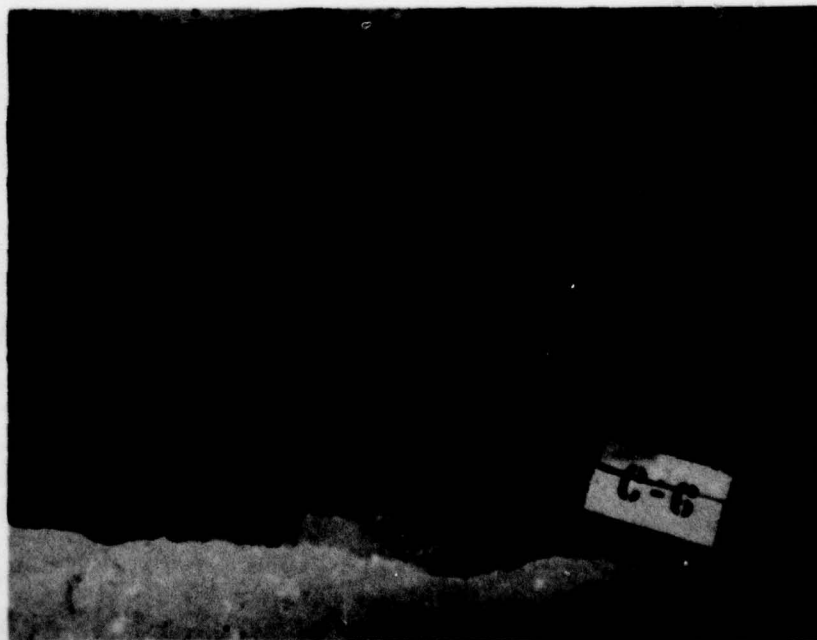


BEFORE

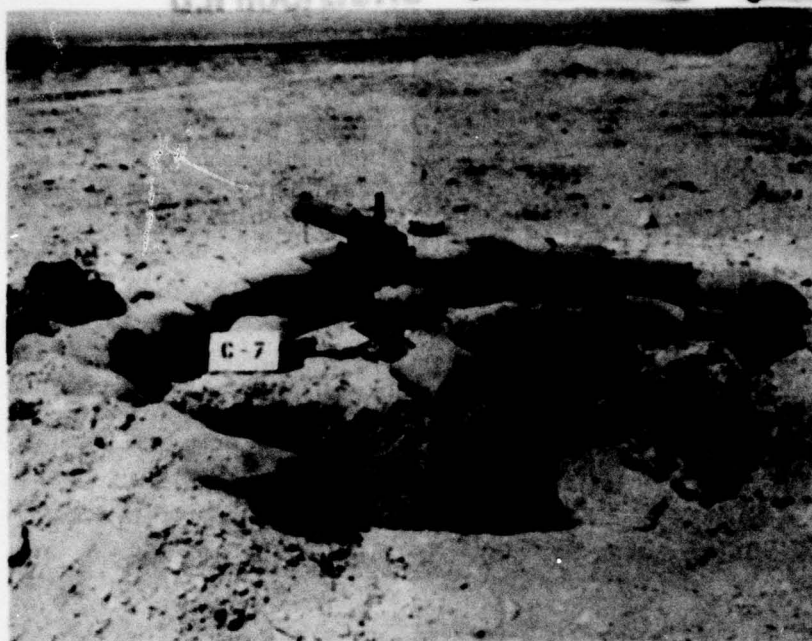
Dummy below ground.
(Herringbone twill
Fatigues) 900 yards
from ground zero.

AFTER

Helmet scorched.
No other damage.



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~~XXXXXXXXXX~~



BEFORE

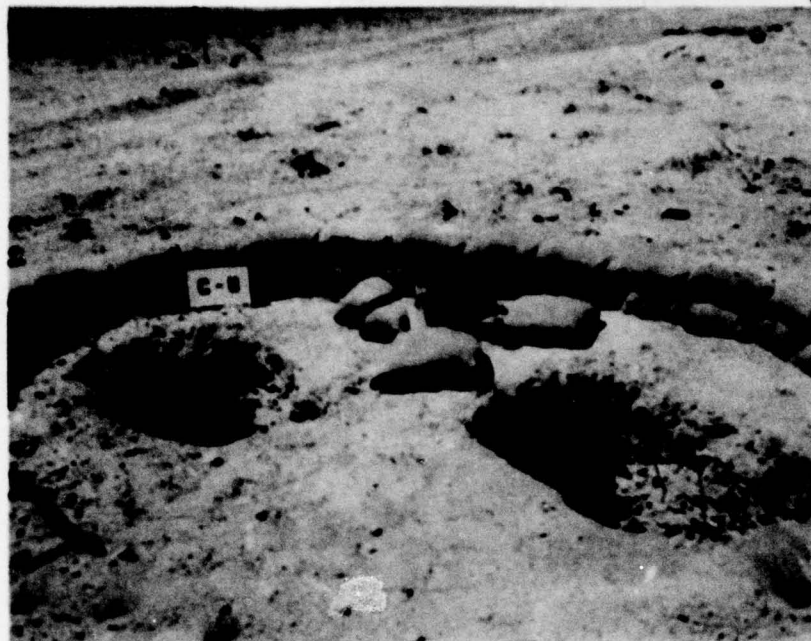
.30 Cal. Machine
Gun Heavy. 900
yards from ground
zero.

AFTER

Paint scorched.
Sandbags burned
Completely oper-
able.



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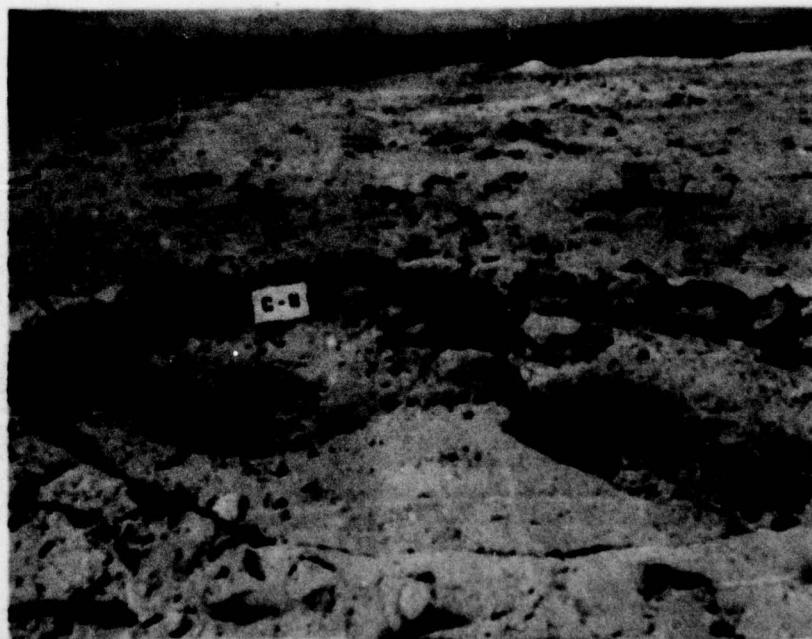


BEFORE

.30 Cal. MG. Lt.
900 yards from
ground zero.

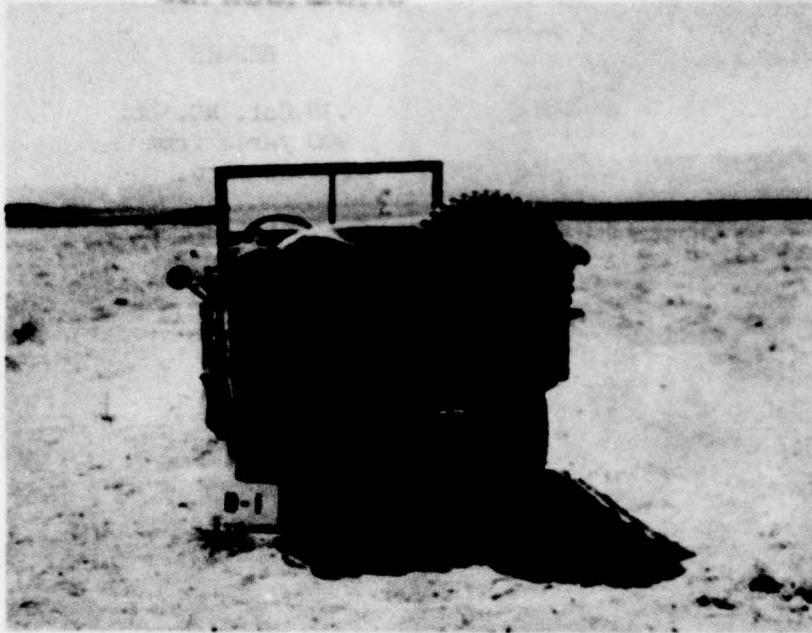
AFTER

Paint scorched.
Sandbags burned.
Completely oper-
able.



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UNCLASSIFIED

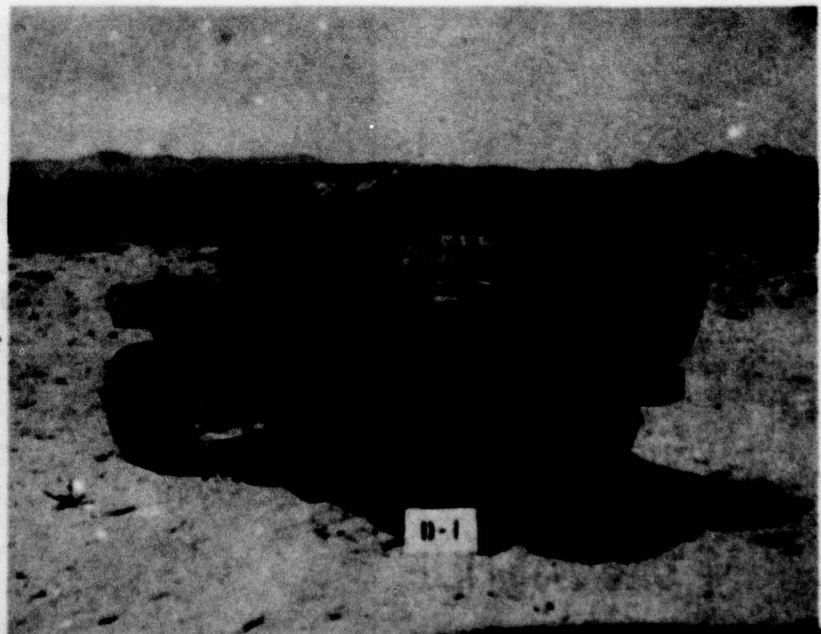


BEFORE

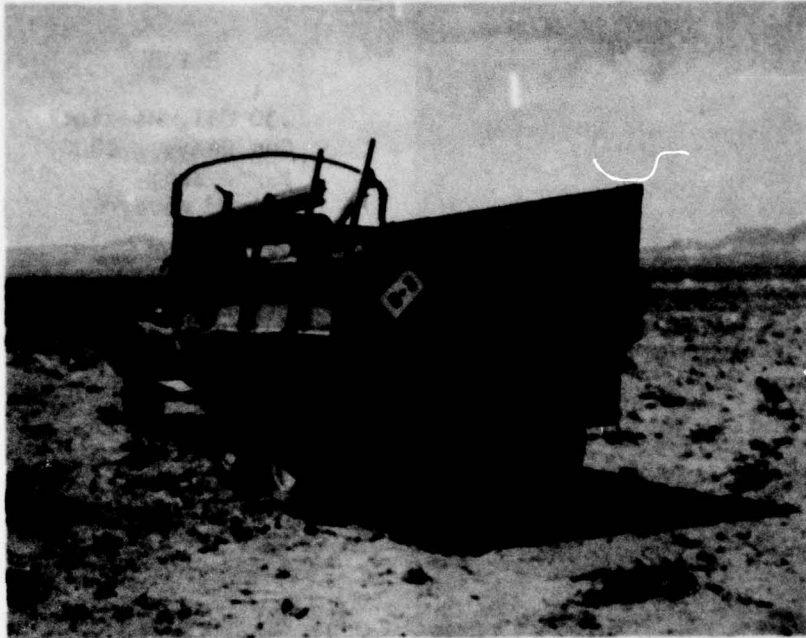
Truck 1/4 Ton.
Faced away from
detonation.
1700 yards from
ground zero.

AFTER

Moved 5'. Paint
and fabric scorch-
ed. Gasoline not
ignited. Vehicle
operable.



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BEFORE

Truck 2 1/2 Ton.
Faced away from
detonation.
Damaged from
previous detona-
tion. 1700 yards
from ground zero.

AFTER

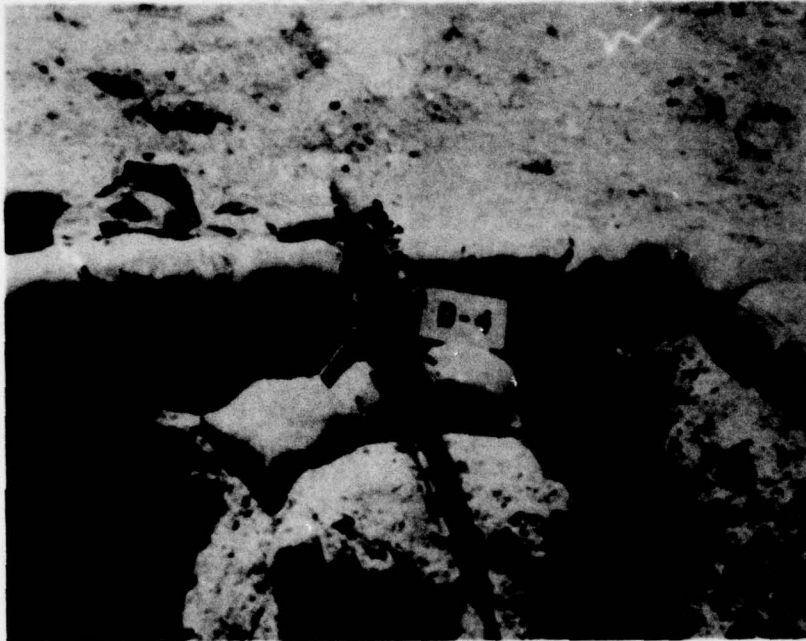
Windshield smashed.
Paint and wood
scorched. Vehicle
operable.



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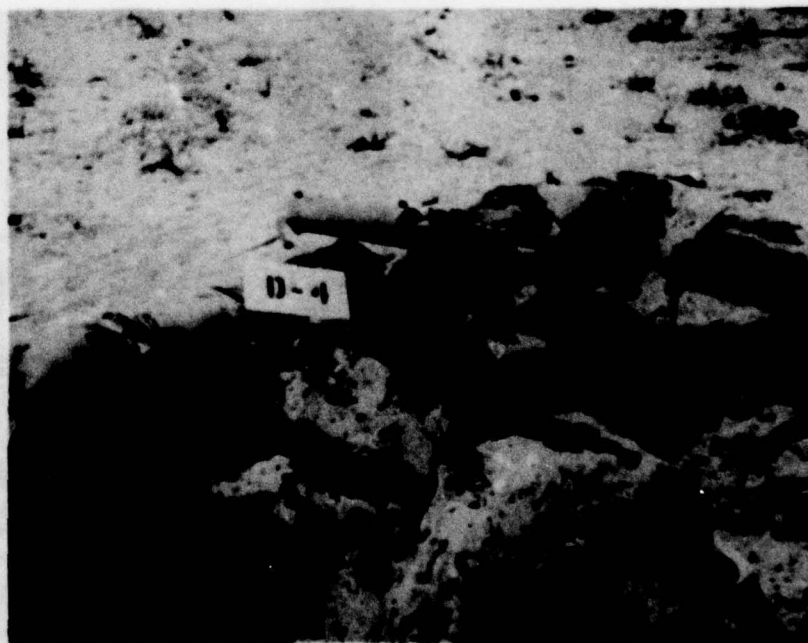


BEFORE

.30 Cal. Machine
Gun Heavy. 1700
yards from
ground zero.

AFTER

Paint scorched.
Sandbags burned.
Gun operable.



UNCLASSIFIED

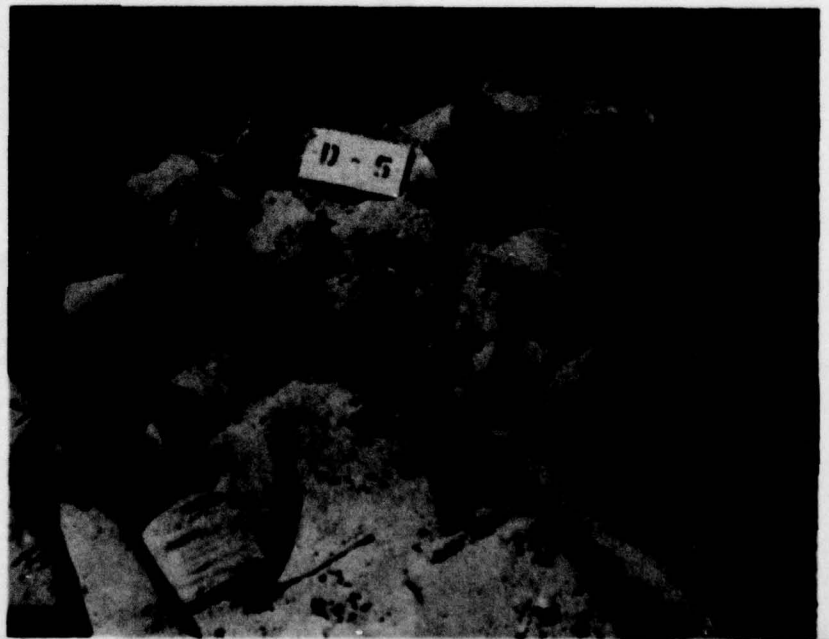


BEFORE

.60-mm Mortar.
Emplaced 1700
yards from
ground zero.

AFTER

Position severely
blasted. Mortar
operable after
cleaning.



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BEFORE

.30 Cal. Machine
Gun Light. 1700
yards from
ground zero.

AFTER

Paint scorched.
Sandbags burned.
Gun operable.



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~~XXXXXXXXXXXXXXXXXXXX~~ **UNCLASSIFIED**

BEFORE

Dummy above ground.
(Herringbone twill
Fatigues) 1700
yards from
ground zero.



AFTER

Burned and blown
apart. Worse
than 550 yards.

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~~XXXXXXXXXXXXXXXXXXXX~~





BEFORE

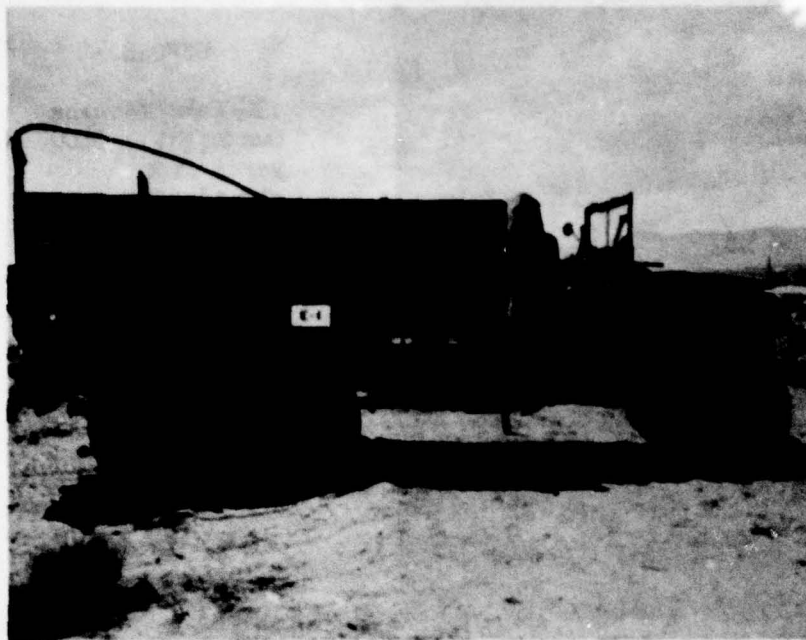
Dummy below ground.
(Herringbone twill
Fatigues). 1700
yards from ground
zero.

AFTER

Sidewall collapsed
partially covering
dummy; otherwise
undamaged.



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~~XXXXXXXXXXXXXXXXXXXX~~
UNCLASSIFIED

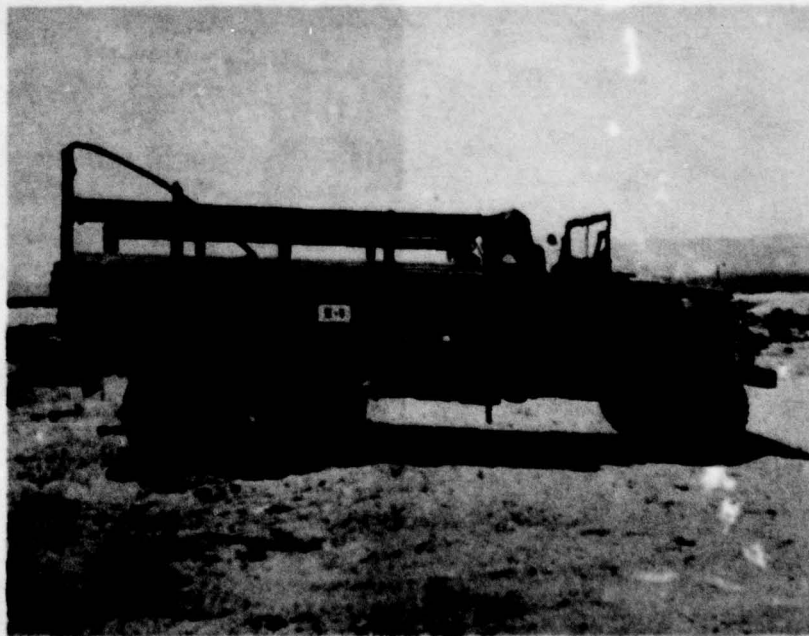


BEFORE

Truck 2 1/2 Ton.
3500 yards from
ground zero.

AFTER

No visible dam-
age.



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~~XXXXXXXXXXXXXXXXXXXX~~
~~XXXXXXXXXXXXXXXXXXXX~~



BEFORE

.30 Cal. Machine
Gun Light. 3500
yards from
ground zero.



AFTER

Sandbags slightly
scorched. Gun
undamaged.

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BEFORE

60-mm Mortar. Em-
placed 3500 yards
from ground zero.

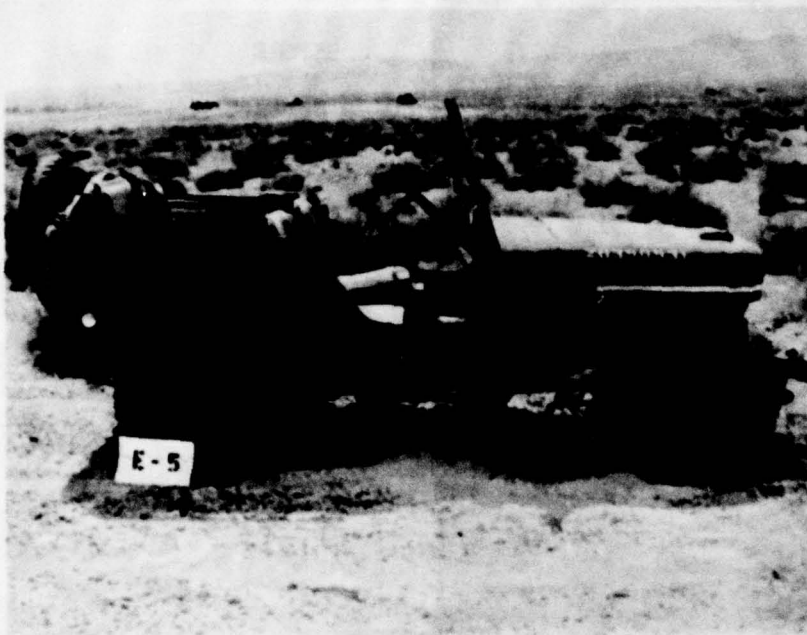
AFTER

No visible dam-
age.

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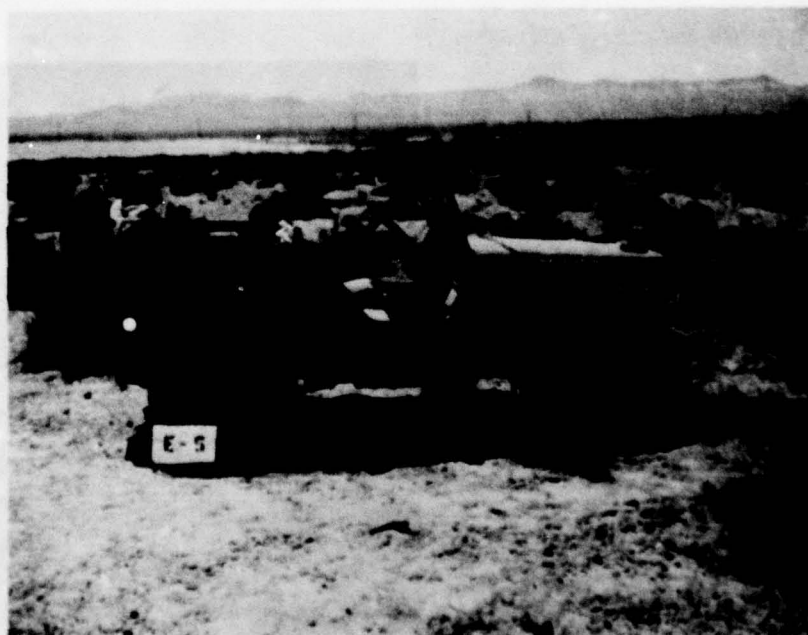


BEFORE

Truck 1/4 Ton.
3500 yards
from ground
zero.

AFTER

No visible dam-
age.



[REDACTED]
[REDACTED]
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BEFORE

.50 Cal. Machine
Gun. 3500 yards
from ground zero.

AFTER

Sandbags scorched.
Gun undamaged.



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[REDACTED]
[REDACTED]

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BEFORE

Dummy below
ground (Herring-
bone twill Pa-
tigue) 3500
yards from
ground zero.

AFTER

No damage.



[REDACTED]
[REDACTED]
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ANNEX V - DAMAGE EFFECTS - EXERCISE DESERT ROCK IV

SHOT NUMBER FOUR

1. For this Shot equipment and clothing (on dummies to simulate personnel) layouts were prepared, both above and below ground, in four positions at distances of 300, 900, 1300, and 1700 yards from ground zero.

2. In general, effects information obtained was:

a. At close in ranges all equipment, including medium tanks, will be destroyed or rendered unusable, by an air burst of a "nominal" weapon at optimum height.

b. At ranges beyond 1000 yards, from an air burst of this size, properly emplaced weapons and equipment are relatively safe.

c. At approximately one mile from ground zero all weapons and equipment, whether above or below ground, appeared to be entirely safe from damage.

d. Troops in average hasty entrenchments at a range of 1700 yards from ground zero are believed safe from all effects of the size burst used in this exercise, provided they are "down" at the time of burst.

e. The level of induced radiation in this exercise was not high enough to have prevented troops from attacking an objective in the vicinity of ground zero immediately following the burst.

3. Detailed descriptions of damage and photographs of equipment and clothing are shown on the following pages.

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[REDACTED]
[REDACTED]

[REDACTED]
UNCLASSIFIED



SHOT NUMBER FOUR - FIRE BALL THREE SECONDS
AFTER DETONATION

135

[REDACTED]
UNCLASSIFIED

[REDACTED]
[REDACTED] **UNCLASSIFIED**



SHOT NUMBER FOUR - MUSHROOM APPROXIMATELY
SIX SECONDS AFTER DE-
TONATION

[REDACTED] **UNCLASSIFIED** [REDACTED]

[REDACTED]
[REDACTED] **UNCLASSIFIED**



SHOT NUMBER FOUR - MUSHROOM APPROXIMATELY
TEN SECONDS AFTER DE-
TONATION

137

[REDACTED] **UNCLASSIFIED** [REDACTED]

[REDACTED] UNCLASSIFIED



105-mm Howitzer
(Self-propelled)
300 yards from
ground zero.

Medium Tank, 300
yards from
ground zero.



138

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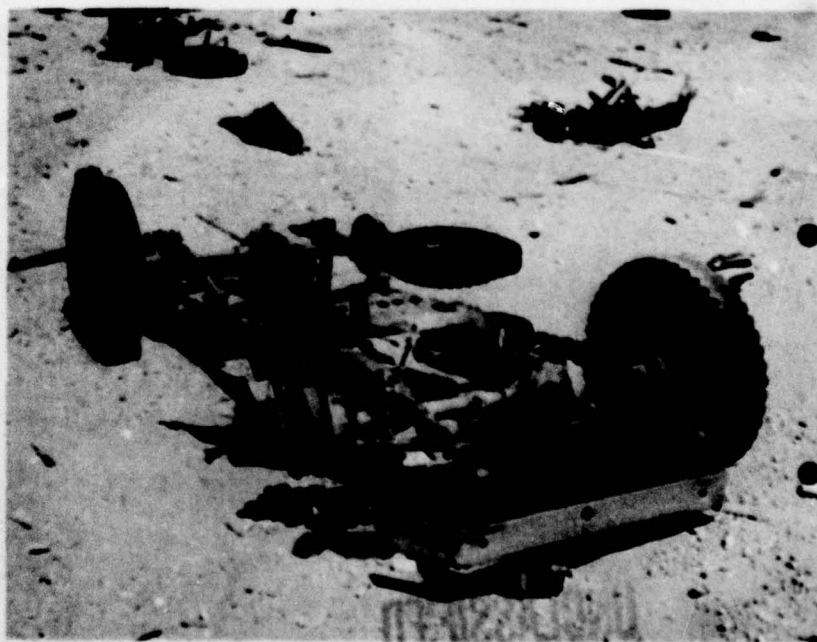
[REDACTED]

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Radar Van, 300
yards from
ground zero.

Truck 1/4 Ton.
300 yards from
ground zero.



EXERCISE DESERT ROCK IV D
EQUIPMENT DAMAGE EFFECTS

Approx Height of Burst 1050'

1 May 1952

Approx KT Yield - 22

0930 Hours

Items of	300 Yards	900 Yards	1300 Yards	1700 Yards
Display	Thrown 25' landing	Shifted 4". Paint		
Medium Tank	1/3 buried. MG blown off. One track damaged. Paint scorched.	burned, metal scorched.		
LVT	Thrown 120'. Damaged beyond repair. Blast-ed out of shape.	Pushed 4' to rear. Paint burned, metal scorched.		
105-mm How	Thrown 60'. Upside down. Paint burned.	Shifted 6'. Paint burned.		
Motor car- riage M7	Blown 10' and out of w/sight emplacement, landing on side. Slight destroyed.	Metal scorched. Slight bent. Lens destroyed.		
105-mm How	Thrown 200'. De-molished.	Thrown 45'. Damaged beyond repair. Exposed fabric burned; wood and paint scorched.		
Truck	Thrown 110'. De-molished.	Pushed 15'. Paint and fabric badly burned.		
1 1/4 Ton	Demolished. Parts blown over 300'.	Thrown 10', overturned. Paint burned; metal scorched.		
MG Cal. .50	Demolished. Parts blown over 300'.	Shifted slightly. Severely scorched.		
AA (Water-cooled)	Blown out of emplacement.			
MG Cal. .50	Blown out of emplacement.			
MG Cal. .50	Blown out of emplacement.			
M2 (Emplaced)	Blown out of emplacement.			
81-mm Mortar	Blown off of mount.	Scorched. Usable		No damage

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Items of	300 Yards	900 Yards	1300 Yards	1700 Yards
Display	Blown out of emplacement 10' to rear.			
60-mm Mortar	Blown out of emplacement 10' to rear.			
Heavy MG Cal.	Blown out of emplacement 20' to rear; severely damaged.	Thrown 10'; severely scorched.		
Light MG Cal. .30	Thrown 10'. Scorched.	Turned. Minor damage.		No damage.
Radar SP-1M	Blown 90'. Demolished.			
2 Vans				
1 Power Unit				
Flamethrower	Thrown and severely damaged.	Thrown 45'. Severely scorched.		No damage.
M2-2	Emplacement caved in. Blast damage.	Not emplaced. Thrown 50'. Damaged severely.		
BD-72 (Emplaced)				
Telephone	Thrown and case burned.	Thrown 65'. Severely damaged.		Blown 8'. Undamaged.
EG8				
Rocket Launcher	Severely damaged by heat and blast.	Thrown 35'. Severely scorched.		No damage.
2.36" M9				
Aiming Circle	Thrown over 100'.	Thrown 40'. Damaged beyond repair.		No damage.
M1	Destroyed.			
Radio, TBX & Reed Equip-ment CE-11	Destroyed.	Thrown 50'. Severely damaged.		17
Radio SCR 300	Thrown 200'. Destroyed.	Thrown 60'. Damaged beyond repair.		
Radio SCR 536	Thrown 200'. Destroyed.	Thrown 65'. Damaged beyond repair.		
Standing Dummy		Thrown 100'. Severely burned.	Blown 80'. Clothing burned & blown off.	All clothing severely burned
Prone Dummy		Completely destroyed by burning.	Clothing burned severely on back. All layers of clothing burned through.	Moved 3'. All clothes on back severely burned.

[REDACTED]

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Items of				
Display	300 Yards	900 Yards	1300 Yards	1700 Yards
Emplaced	Completely burned.	Undamaged.	Undamaged.	Undamaged.
Dummy				
Rifle	Blown 100'. Stock	Thrown 50'.		Stock
Cal. .30	burned and broken.	Scorched.		slightly
Gas Mask	Destroyed.	Thrown 90'.		scorched.
		Usable.		Undamaged.

[REDACTED]

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[REDACTED]
[REDACTED]
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ANNEX V - DAMAGE EFFECTS - EXERCISE DESERT ROCK IV

SHOT NUMBER SIX

Unusual damage effects noted in connection with this explosion include:

1. The blast effect on a medium tank at two hundred yards. In this display, the gun turret with gun was severed from the under-carriage and thrown over fifty feet from its original location. The gun tube was bent at a point approximately three feet forward of the breech. The tank carriage was twisted and driven into the ground. Tracks and all other exposed parts were partially destroyed.
2. The scattering of parts of a completely disintegrated 1/4 ton truck, located at two hundred yards from ground zero, over a distance of four hundred yards from the original position.
3. The picking up of a 2 1/2 ton truck and 1/4 ton truck, located five hundred and fifty yards from ground zero, and throwing them in the air thirty and fifty yards respectively from their original positions.
4. Small stones and pieces of cacti were picked up by the blast and imbedded in jeep and truck tires.
5. Damage effects to new type clothing displayed by The QM General's Office revealed the following:

The outer OD colored cloth of a test parka was burned and blasted off the front side of the dummy at 1700 yards.

The exposed side of a 1952 model fatigue jacket was also completely burned and blasted away at 1700 yards. The cotton undershirt was severely scorched.

A cotton khaki shirt, and light colored wool samples were slightly scorched at 1700 yards but remained serviceable.

The most outstanding and apparently least damaged dark material was a sample of almost black, spun orlon. No damage was visible on this piece of fabric at the 1700 yard display.
6. Fires were ignited in vegetation over 3500 yards from the blast in a northwesterly direction.

[REDACTED]
[REDACTED]
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[REDACTED]

EXERCISE DESERT ROCK IV F
EQUIPMENT DAMAGE EFFECTS

Approx Height of Burst - 300'

25 May 52

Approx KT Yield - 14

0500 Hours

Weather - Cool, few scattered clouds
Wind - Light from S.W.

Items of Display	200 Yards	550 Yards	900 Yards	1700 Yards	3500 Yards
Medium Tank	Turret w/gun blown off by blast and thrown 50 yds from undercarriage. Gun barrel bent.				
Light Tank		Moved sidewise 18" by blast. Finish severely blasted by small rocks. Vehicle operable.			
Truck 1/2 Ton		Picked up by blast and thrown 100'. Vehicle landed on side, extensively damaged and inoperable.		Scorched but otherwise undamaged, and operable.	
Truck 1/4 Ton					No visible damage. Vehicle completely operable.
Truck 1/4 Ton	Completely dis-integrated, frame twisted, engine thrown 150 yds from original position. Tires 300 yds from original position, hood 400 yds from original position.	Picked up and thrown by blast approximately 150'. Vehicle completely inoperable.	First vehicle scorched but otherwise undamaged. Operable. 2nd vehicle turned on side. Scorched but operable.	Dummy in operators seat slightly scorched. Vehicle undamaged. Operable.	No visible damage. Operable.

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Items of Equipment	200 Yards	550 Yards	900 Yards	1700 Yards	3500 Yards
105-mm Howitzer (Emplaced)			Wooden handles scorched, gun appeared to be operable.	Slightly scorched, weapon operable. Dummy operator dressed in under- wear (wool) set on fire.	
30 Cal. Hvy MG (Emplaced)		Gun and mount blown 25' from position, inoper- able due to sand blast and strik- ing ground. Sand bags around posi- tion burst and partially burned.	Some sand blast but weapon ap- peared to be operable. More burning of sand- bags, part of contents lost by blast.	Slight scorching, otherwise no vis- ible damage to weapon. Operable.	No visible damage to either weapon or position.
30 Cal. Lt MG (Emplaced)		Weapon inoperable from sand blast. Sandbags around position scorched and burst, half of contents blown out.	Some sand blast but weapon ap- peared to be operable.	Sandbags scorched no visible damage to weapon.	No visible damage
105-mm Howitzer (Emplaced)		Weapon inoperable due to heavy sand and rock blasting. Sight mounting was cracked. Thermal effect was negligible.	Emplacement prepared from dirt (no gun), showed no visible damage.		
60-mm Mortar (Emplaced)		Sandbags blasted apart, wall away from blast collapsed. Weapon partially covered w/dirt but appeared operable.		Sandbags scorched and burst, weapon completely operable.	No visible damage to either position or weapon.
80-mm Mortar (Emplaced)			Sandbags burned and burst, weapon appeared to be operable.		

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Items of Display	200 Yards	550 Yards	900 Yards	1700 Yards	3500 Yards
57-mm Recoilless Rifle				No visible damage to weapon, sandbags around position scorched and burst.	
M-1 Rifle (On surface)			Stock scorched but weapon appeared operable.		No visible damage
Walky-Talky SCR 300 (In hole 4' deep)			Top joint of aerial blown loose, no other visible damage. Radio operable. Sandbags scorched & burst.	No visible damage, radio operable. Sandbags scorched & burst.	
12 Drop Switch-board (Used in previous test)	No apparent additional damage.				
Dummy (OD Herringbone twill) found on surface	Nothing found of dummy. 400 yards.	Parts scorched but not ignited. Scattered over area of 400 yards.	Blasted apart and scattered over wide area. Parts of clothing were scorched but not ignited.	Slight scorch, partially dismembered from blast effect.	No visible damage.
Dummy (OD Herringbone twill) in foxhole	Partially covered with debris, not dismembered. Very light scorch.				No visible damage.
Dummy in woolen underwear (On surface)			Slightly scorched. Blasted apart.	Ignited & destroyed by fire.	
Fabric Test on Pine Board	OD Herringbone twill, white cotton, & khaki all burned & blasted off of board.		OD Herringbone twill white cotton, and khaki all burned & blasted off board, but board underneath was not scorched.	OD Herringbone twill burned & blasted off to either type of board, white cotton & khaki slightly scorched.	No visible effects

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Item of Display	200 Yards	550 Yards	900 Yards	1700 Yards	3500 Yards
Covered Fox-hole. 4"x4" board, pine. Sandbags & dirt cover		Front board moved 4" at one end. Cover otherwise in good condition. Walls in good condition.	Slight scorching on sandbags, cover & wall undamaged.	Slight scorching of bags(sand). No other visible damage.	No visible damage.
Gas Mask (On surface)		Blasted on ground but appeared to be completely serviceable.	No visible damage from either scorch or blast.		
Live Sheep (In wire & board cage on surface)			Scorched all over right side, not blinded, very active two hours after detonation. Boards on pen scorched on ground zero side. Alfalfa hay not ignited.	Light scorch on rump & back of head, no other injury visible two hours after blast.	No visible thermal or blast effects two hours after blast.
Live Sheep (In foxhole 4' deep)			No visible injury from blast or thermal effects.	No visible injury from blast or thermal effects.	No visible injury from blast or thermal effects.
Vegetation (Sage, Grease wood, Joshua trees)	Almost completely re-moved from blast & thermal effect.	About three-fourths destroyed by blast & thermal effects.	Uprooting was quite apparent at this distance but very little thermal effect evident. Occasional fires in Joshua trees.	Some thinning by removal of leaves by blast effect. Occasional fires in Joshua trees.	No apparent effect in display area but fires were set at 4000 yds or more up a draw running northwest from ground zero.
Film Badge Reading at Time of blast					
CBR Reading 1 1/2 Hrs after blast	300 yds 10-R 2-R		300 NR	10 NR	.2 NR
CBR Reading 24 Hrs after blast	300 yds 1 1/2 R		Background	Background	Background

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NEW CLOTHING AND FABRIC DISPLAY
SHOT NUMBER SIX

0500 HOURS 25 MAY 1952

Item of Display	1800 Yards	2800 Yards
Parka, two types of fur wolverine and synthetic	Both types of fur scorched around face of dummy. OD outer cloth burned & blasted off of front, white cotton lining scorched. Dummy stand on 5/8" pipe bent to ground by blast effect. Back side of parka undamaged.	Wolverine fur slightly scorched on left side facing blast, black hair on synthetic fur appeared to be partially fused together. No visible scorching of fabric.
Face Cream - 6 II 8400 (Gray)	Some bubbles caused by heat; light scorch.	Thin sample scorched. Heavy sample few bubbles. No visible scorching.
Field Jacket (1951) (OD cotton w/liner)	Badly scorched & split around pockets by blast effect on burned material. Jacket remained intact but not serviceable; back side undamaged.	No visible thermal effects.
Cloth samples (On Rack)	White wool underwear scorched, new fatigue jacket fabric burned & blasted off display. Other dark materials burned but extent of damage could not be ascertained by visual observation. Black sample of spun orlon appeared to be in good condition.	No visible scorching or blast effect.
Field Jacket (OD cotton) Not same jacket as above	Badly scorched, split around pockets by blast effect on burned material. Jacket remained intact but not serviceable. Back side undamaged.	No visible damage.
Khaki Shirt (Cotton)	Very light scorching effect.	No visible damage.
Cotton Fatigue Jacket (New type - OD 1952)	Single thickness parts burned & blasted off dummy. Heavy scorching effect on chest of white cotton undershirt. Back side undamaged.	No visible damage.

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[REDACTED]
[REDACTED]
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SHOT NUMBER SIX

GAMMA RADIATION INTENSITY TEST

550-Yard Position

<u>Position</u>	<u>Dose in Roentgens</u>
1. Below ground in 60-mm Mortar Pit	1000
2. Above ground at 60-mm Mortar Pit	1500*
3. In driver's seat of 6x6 truck (2 1/2 ton)	1500*
4. In driver's seat of M24 Lt Truck	1500*

900-Yard Position

5. In animal pit	150
6. On animal cage	1250
7. Film badge on dummy with .50 Cal. MG (Not recovered)	
8. Below ground in Mortar Pit	150
9. Above ground at Mortar Pit	1500*
10. In driver's seat of jeep	1130

1700-Yard Position

11. In animal pit	---
12. On animal cage	110
13. On dummy at .50 Cal. MG	105
14. Below ground in foxhole	---
15. Above ground in foxhole	100
16. In driver's seat of 2 1/2 Ton Truck	90

[REDACTED]
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[REDACTED]

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[REDACTED]

3500-Yard Position

- | | |
|----------------------------------|-----|
| 17. Below ground in foxhole | --- |
| 18. Above ground at foxhole | --- |
| 19. On dummy | --- |
| 20. Animal cage | --- |
| 21. Driver's seat, 3/4 Ton Truck | --- |

No calibration film was processed along with these badges. Exposures were calculated with an old 556 exposure in roentgens vs density curve. The above values are only approximately accurate.

- * Film badges at these locations registered their maximum capacity of 1500 roentgens.

[REDACTED]

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BEFORE

M-46 Tank. 200
yards from ground
zero.

AFTER

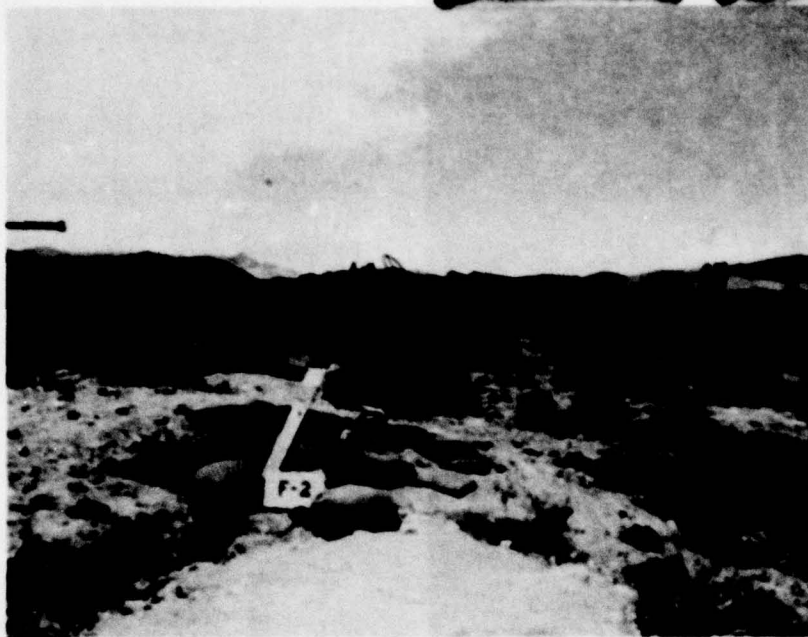
Turret and gun blown
approximately 50 yds
from chassis, gun
bent.

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BEFORE

Truck, 1/4 Ton.
200 yards from
ground zero.

AFTER

Vehicle disintegrated.
Engine blown 150 yds.
Note lack of vegeta-
tion and crust formed
on ground.

152



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BEFORE

Dummy in foxhole
550 yards from
ground zero.



AFTER

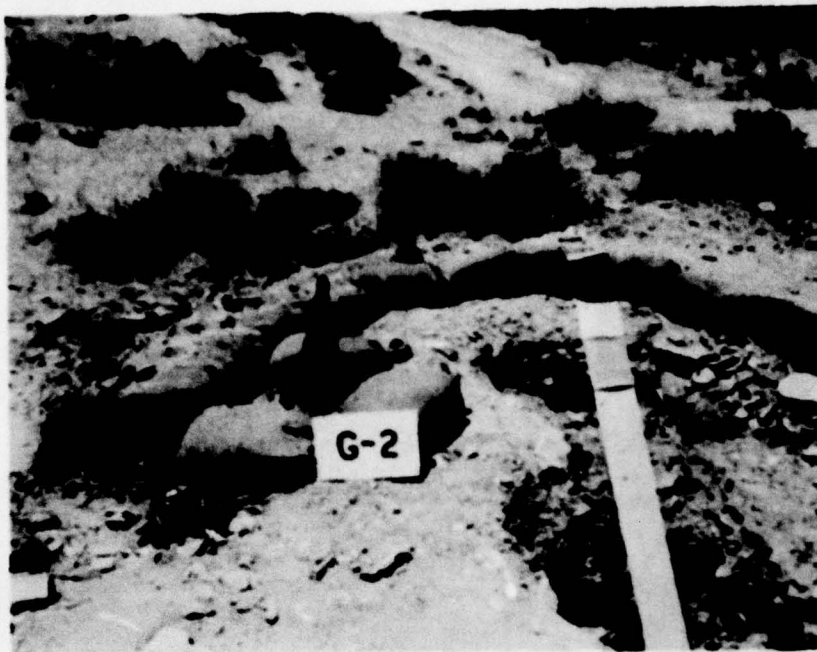
Dummy intact, rifle
operable. Note
blasted sandbags.

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BEFORE

.30 Cal. Lt MG.
Position and
cloth sample 550
yards from ground
zero.



AFTER

Weapon inoperable
due to rock blast-
ing. Note protec-
tion given to board
by cloth sample.

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SECURITY INFORMATION

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BEFORE

105-mm Howitzer.
Position 550 yds
from ground zero.

AFTER

Weapon inoperable
due to rock blast-
ing of brass sight
mountings.

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BEFORE

60-mm Mortar.
Position 550
yards from
ground zero.

AFTER

Weapon operable.
Partial sidewall
collapse.

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BEFORE

.30 Cal. Hvy MG.
550 yards from
ground zero.

AFTER

Weapon blown 25 yards.
Inoperable due to rock
and sand blast. Sand-
bags burst.

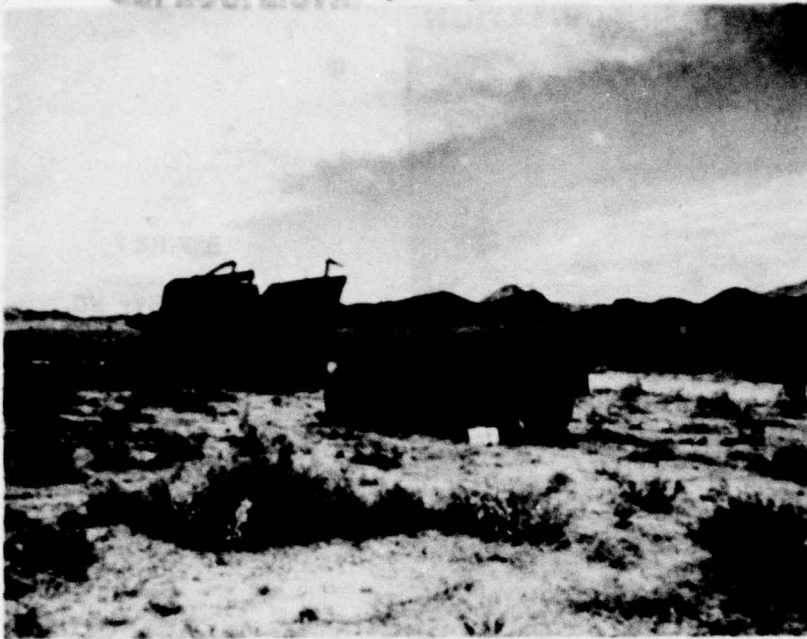
157



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BEFORE

Trucks - 2 1/2 &
1/4 Ton. 500 yds
from ground zero.

AFTER

2 1/2 T. Truck: Picked
up by blast, thrown 100'.
Landed on side; extensive
damage. Inoperable.

1/4 T Truck: Picked up
and thrown by blast
approximately 150'. Ve-
hicle completely
inoperable.



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BEFORE

M-24 Tank. 550
yards from ground
zero.

AFTER

Slid sideways 18" by
blast, forward side
severely rock and
sand blasted.

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BEFORE

Dummy, .50 Cal. MG;
.30 Cal. MG. 900
yds from ground
zero.

AFTER

Weapons sandblasted.
Appeared operable.
Dummy blasted apart;
scattered over wide
area; clothing burned
but not ignited.

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BEFORE

Dummy and Gas Mask
in foxhole 1700
yards from ground
zero.

AFTER

Dummy partly covered
with debris and dirt,
gas mask undamaged.



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BEFORE

Dummy with M-1
Rifle. 900 yds
from ground zero.

AFTER

Dummy scattered 75
yds, rifle stock
charred, weapon
operable.



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BEFORE

.30 Cal. Hvy MG.
900 yards from
ground zero.

AFTER

No visible damage
to weapon.

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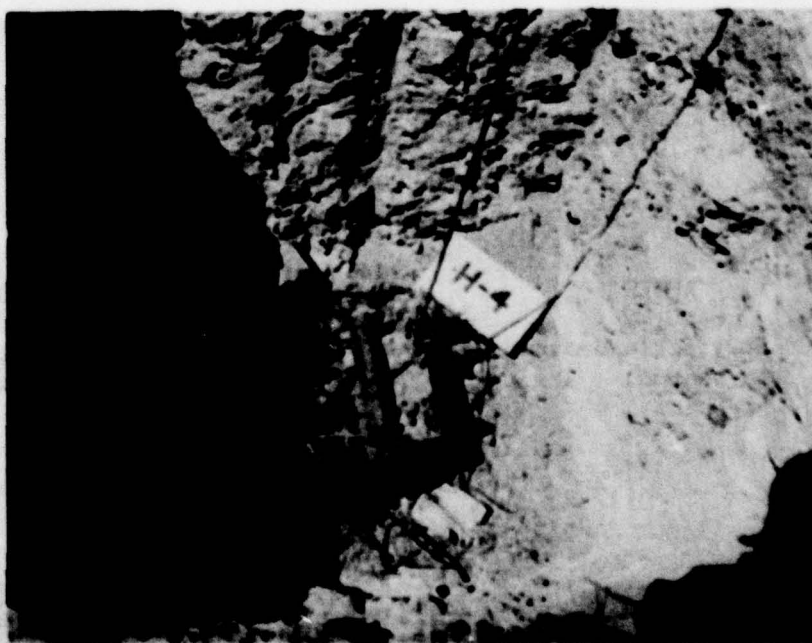
BEFORE

SCR-300 Walky-Talky
900 yds from ground
zero.

AFTER

Emplacement partially
caved in. No damage
to radio.

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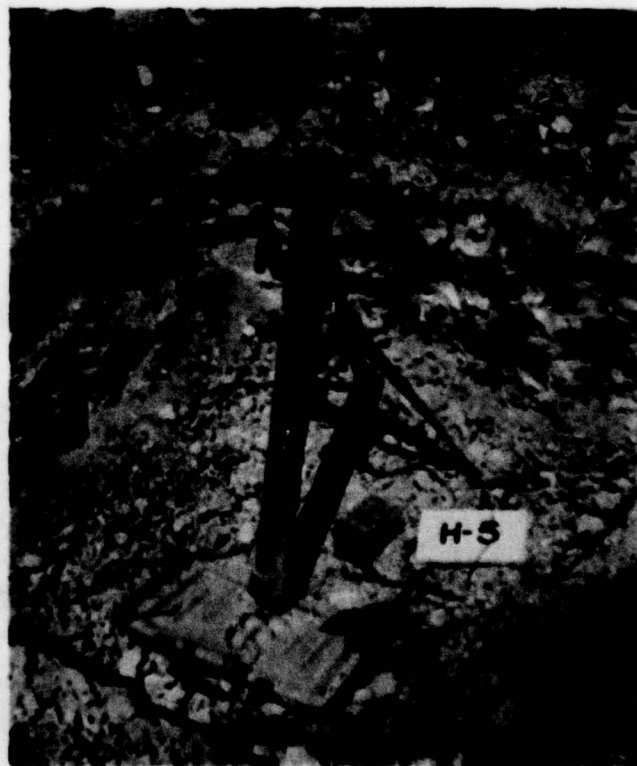


BEFORE

81-mm Mortar. 900
yards from ground
zero.

AFTER

Weapon undamaged.



165

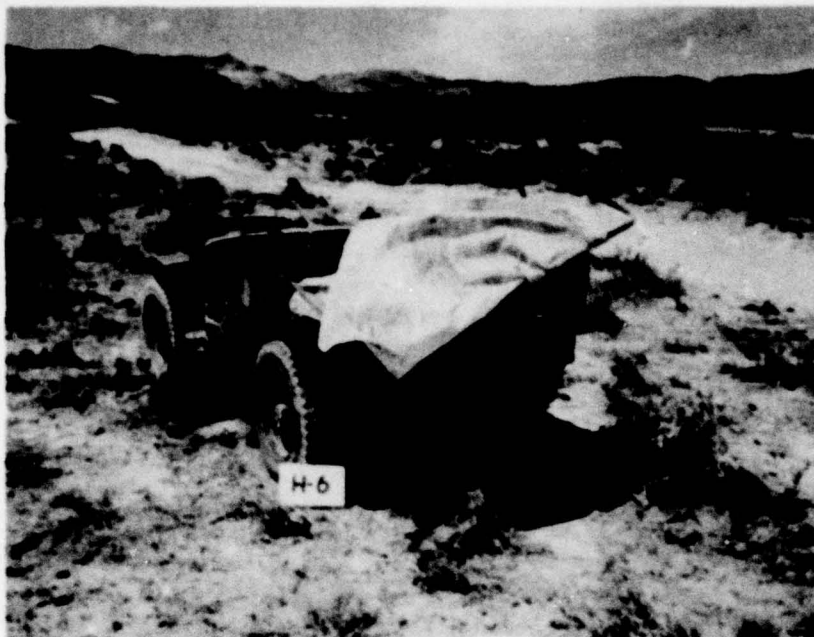
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SECURITY INFORMATION

~~RESTRICTED DATA~~ ATOMIC ENERGY ACT-1946

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BEFORE

Truck 1/4 Ton. 900
yards from ground
zero.

AFTER

Canvas top blown
partly off.

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SECURITY INFORMATION

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SECURITY INFORMATION UNCLASSIFIED



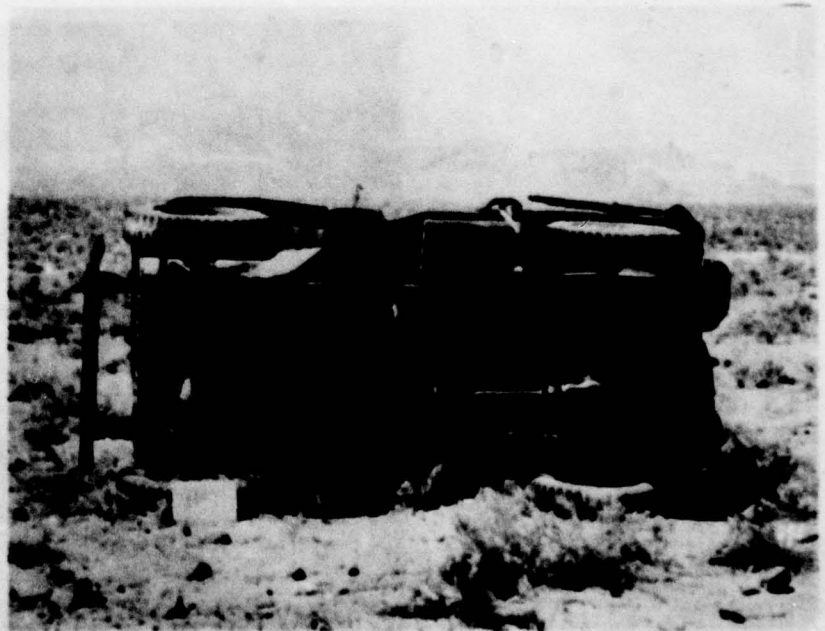
BEFORE

Truck 1/4 Ton. 900
yards from ground
zero.

AFTER

Vehicle turned on
side but operable.

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BEFORE

Dummy 1700 yards
from ground zero,
with .50 Cal. MG.

AFTER

Dummy burned complete-
ly. Gun operable.



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SECURITY INFORMATION

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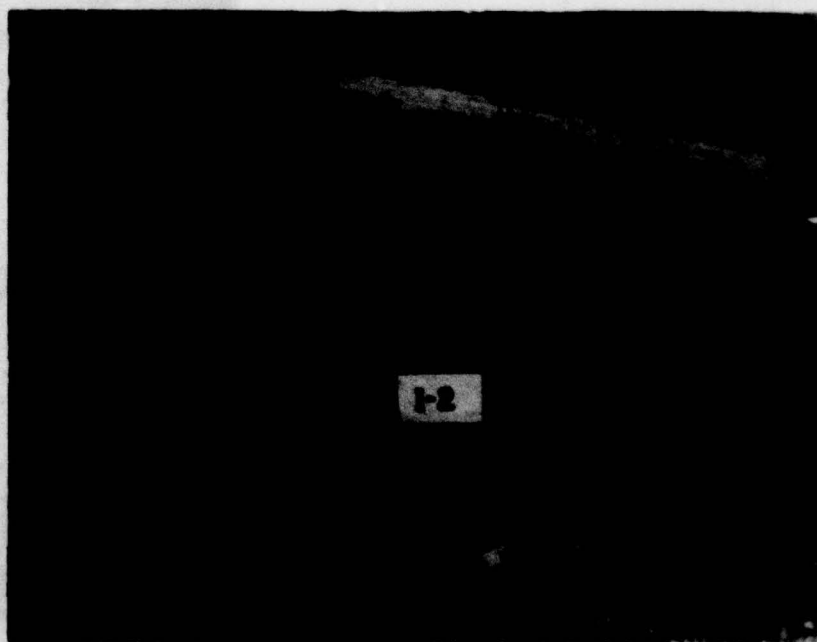


BEFORE

Dummy 1700 yards
From ground zero.

AFTER
Clothing torn and
scorched.

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BEFORE

Dummy and Gas Mask
in foxhole with
cloth samples 1700
yards from ground
zero.



AFTER

Contents of foxhole
undamaged. Cloth
samples on board
burned and blasted.

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BEFORE

57-mm Recoilless
Rifle 1700 yards
from ground zero.

AFTER

Sandbags scorched.
Guns undamaged.



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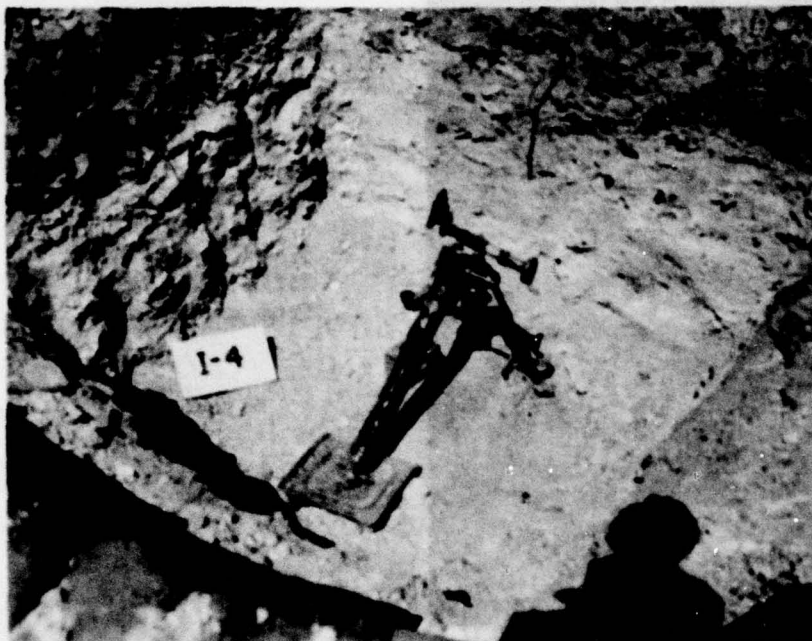
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SECURITY INFORMATION

~~RESTRICTED DATA~~

ATOMIC ENERGY ACT-1946

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BEFORE

60-mm Mortar 1700
yards from ground
zero.

AFTER

Mortar undamaged.

172

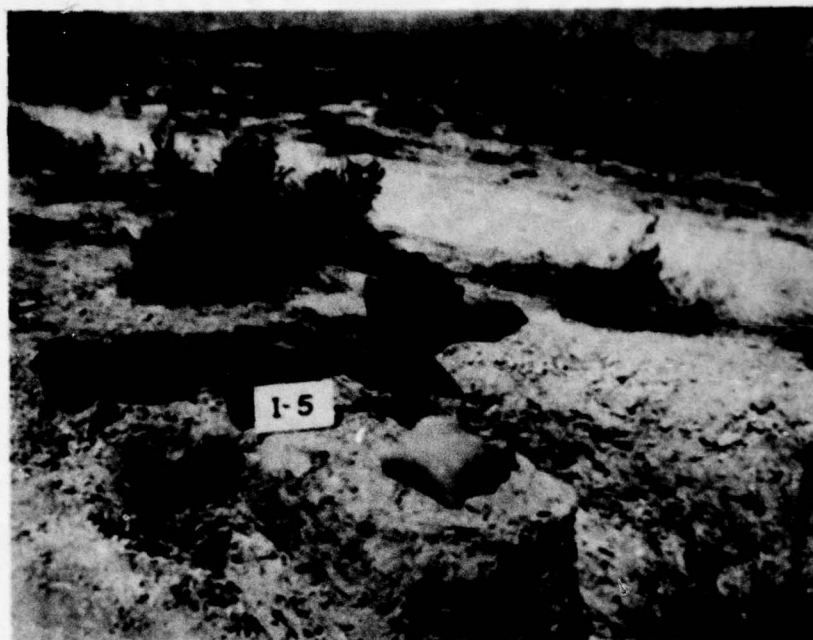


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BEFORE

.30 Cal. MG. 1700
yards from ground
zero.

AFTER

Sandbags scorched.
Gun undamaged.

173

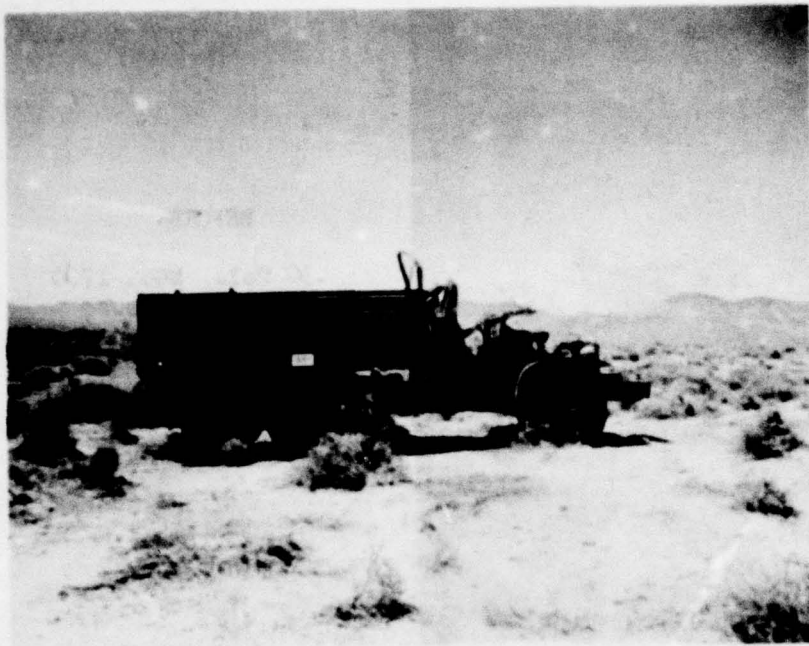


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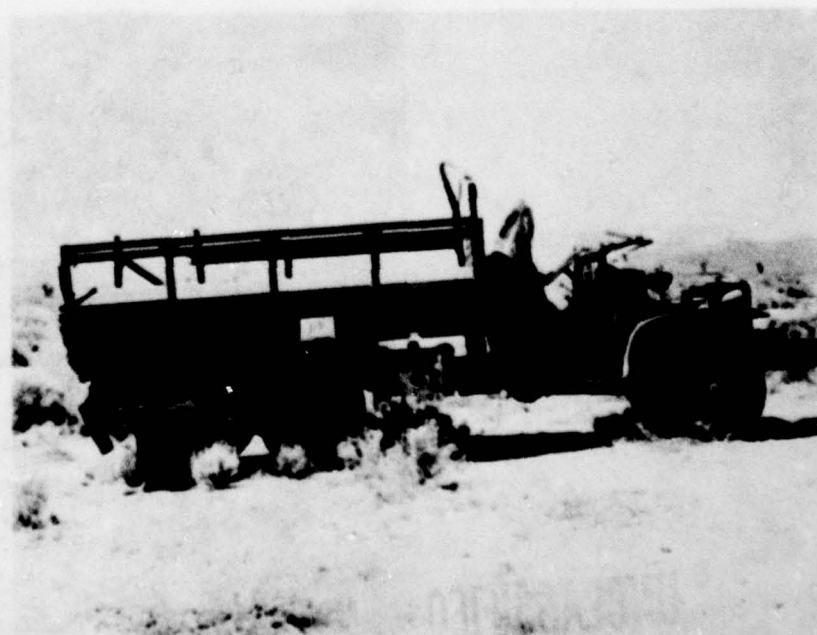
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BEFORE

Truck 2 1/2 Ton.
1700 yards from
ground zero.

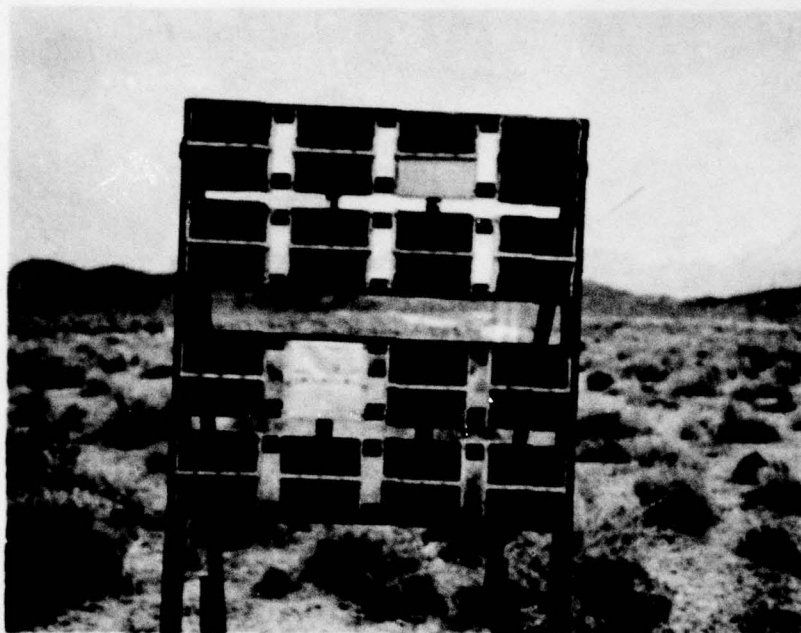
AFTER
Undamaged



174

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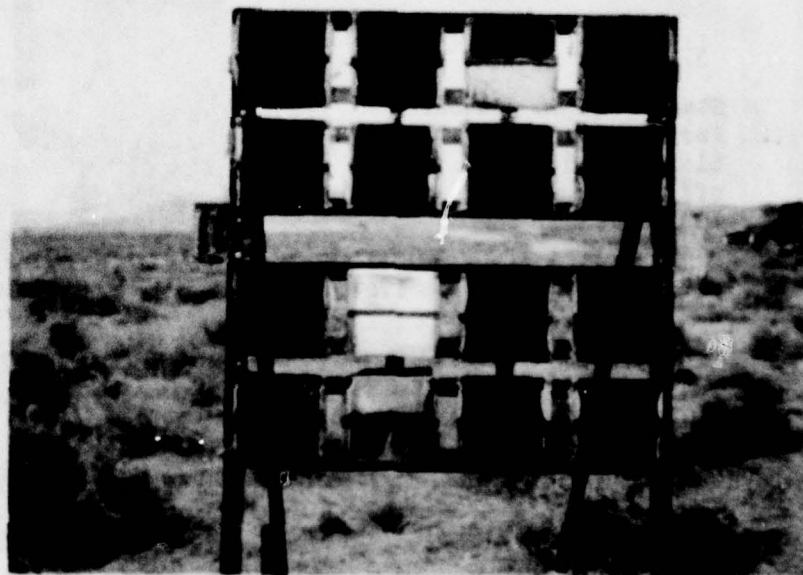
BEFORE

Cloth Samples 1800
yards from ground
zero.

AFTER

White cotton scorched.
OD cotton burned and
blasted off board.
All dark fabrics ex-
cept orlon showed
scorch.

175



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BEFORE

Parka 1800 yards
from ground zero.

AFTER

Stand bent to ground.
Parka outer cloth
blasted and burned
off, white wool lin-
ing scorched, fur
scorched.

176



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BEFORE

Lightweight Fatigue
Shirt. 1800 yards
from ground zero.

AFTER

Front burned and
blasted off, chest
of undershirt
heavily scorched.
Note: Collar
points in scorched
area.

177



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BEFORE

Field Jacket 1800
yards from ground
zero.

AFTER

Front scorched,
pockets blasted
loose. Note
print of collar
points.



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BEFORE

Khaki Shirt 1800
yards from ground
zero.

AFTER

Very lightly scorched.

179

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BEFORE

Lightweight Wool OD
Jacket 2800 yards
from ground zero.

AFTER
No damage.

180



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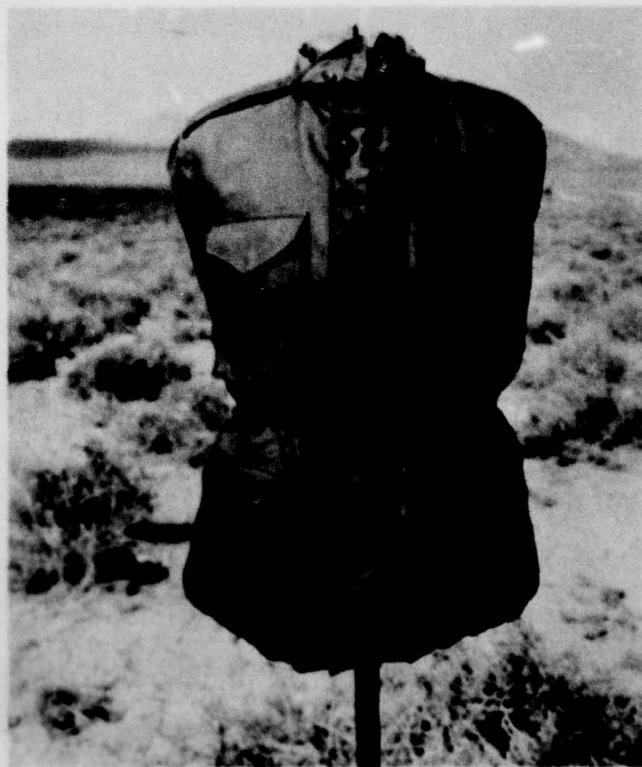
BEFORE

Field Jacket 2800
yards from ground
zero.

AFTER

No visible effect.

181



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BEFORE

Khaki Shirt 2800
yards from ground
zero.

AFTER

No damage.

182



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BEFORE

Parka 2800 yards
from ground zero.



AFTER

Fur slightly scorched,
very light scorch on
fabric.

183

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BEFORE

Lightweight Fatigue
Shirt 2800 yards
from ground zero.

AFTER

No visible effect.

184



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BEFORE

Observation Post
3500 yards from
ground zero.

AFTER
No damage.

185



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BEFORE

.30 Cal. Lt MG.
3500 yards from
ground zero.

AFTER

No damage.

186



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BEFORE

Dummy in foxhole
3500 yards from
ground zero.

AFTER

No damage.

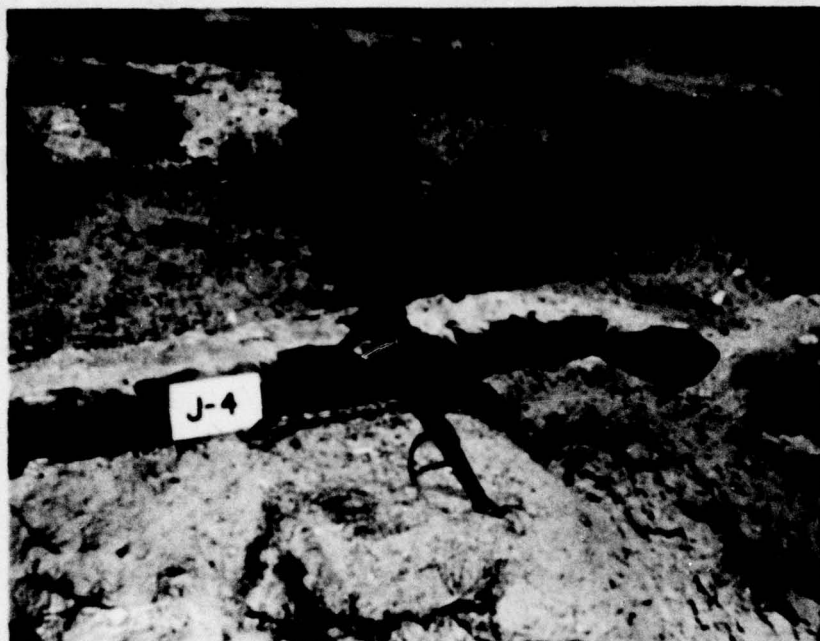
187



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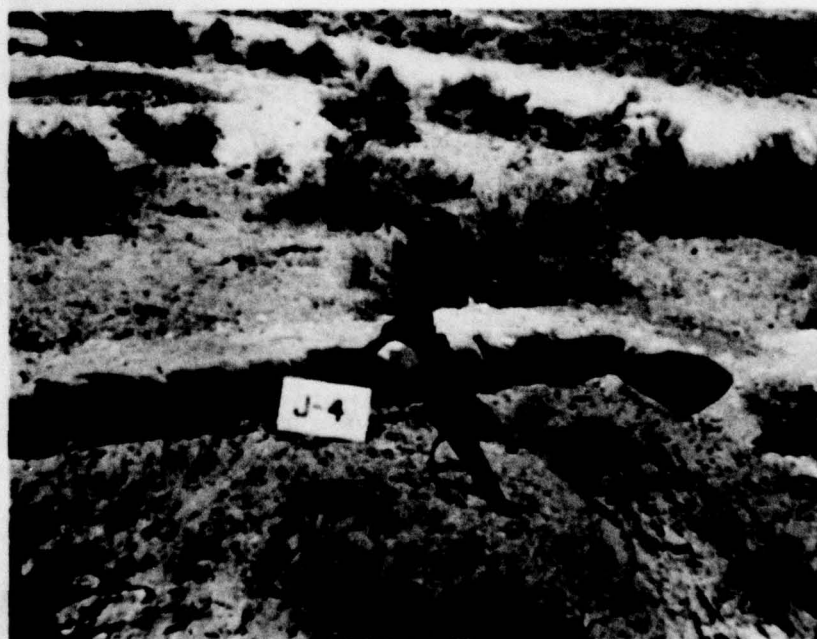
BEFORE

.30 Cal. Hvy MG.
3500 yards from
ground zero.

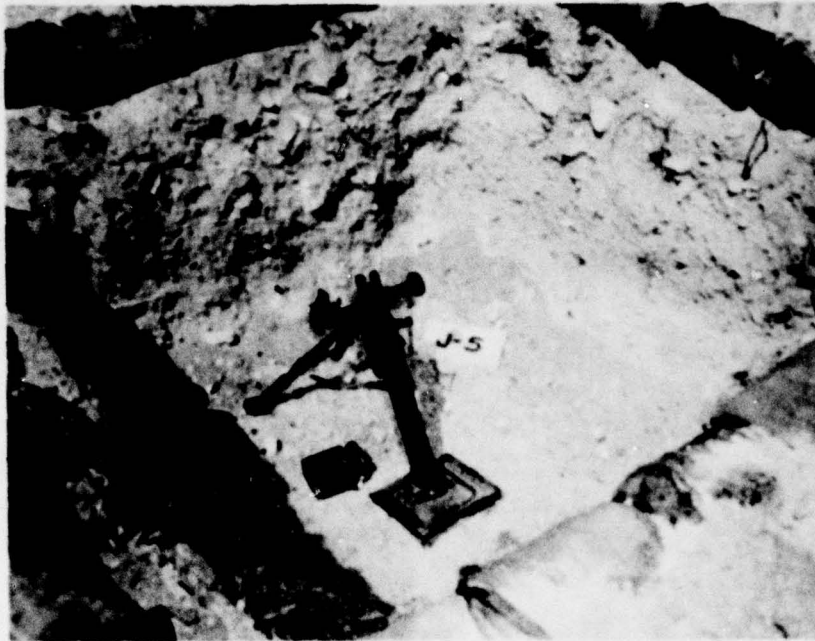
AFTER

No damage.

188



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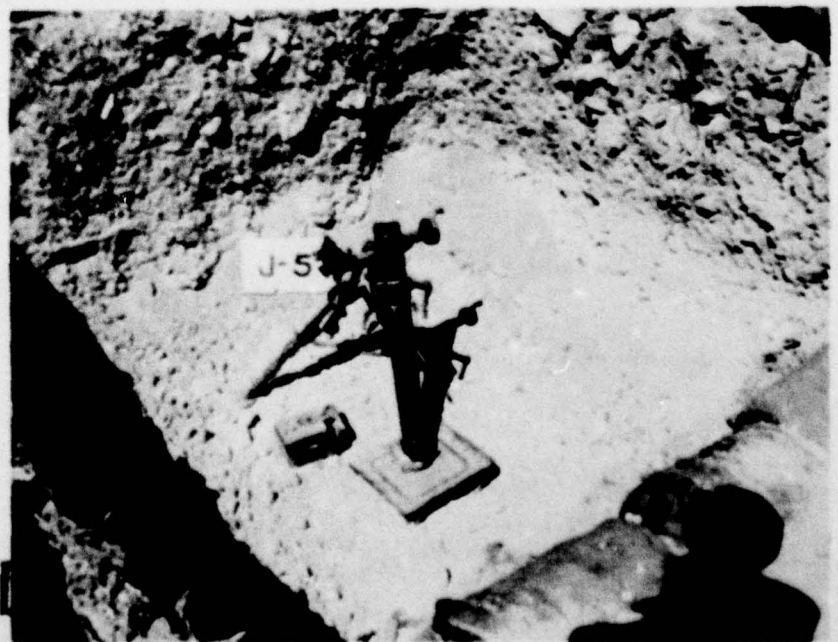


BEFORE

60-mm Mortar 3500
yards from ground
zero.

AFTER

No damage.



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SHOT NUMBER EIGHT - ATOMIC CLOUD

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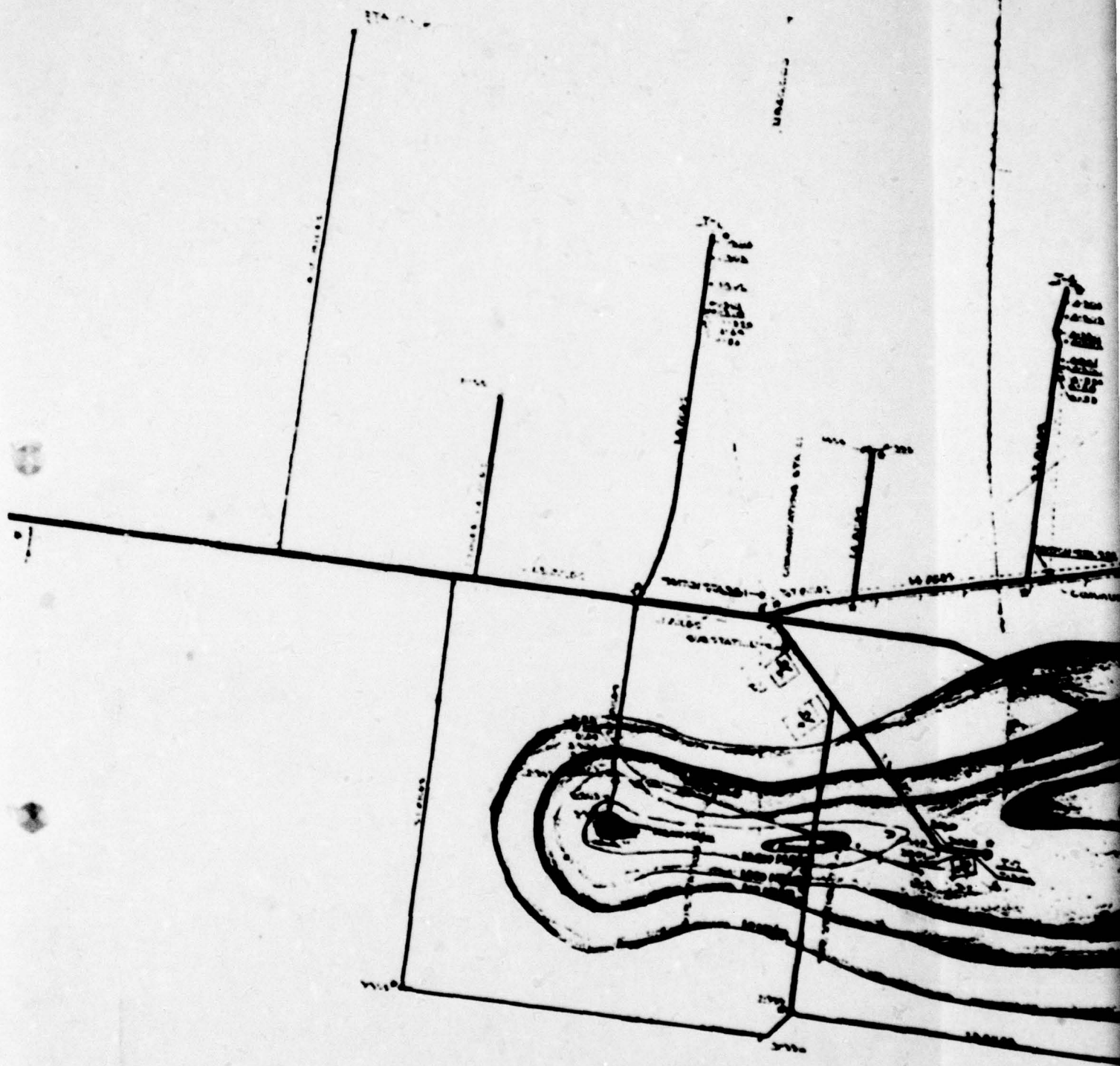
SHOT NUMBER EIGHT - TROOPS IN TRENCHES, DUST
BANK AT GROUND ZERO,
ATOMIC CLOUD

191

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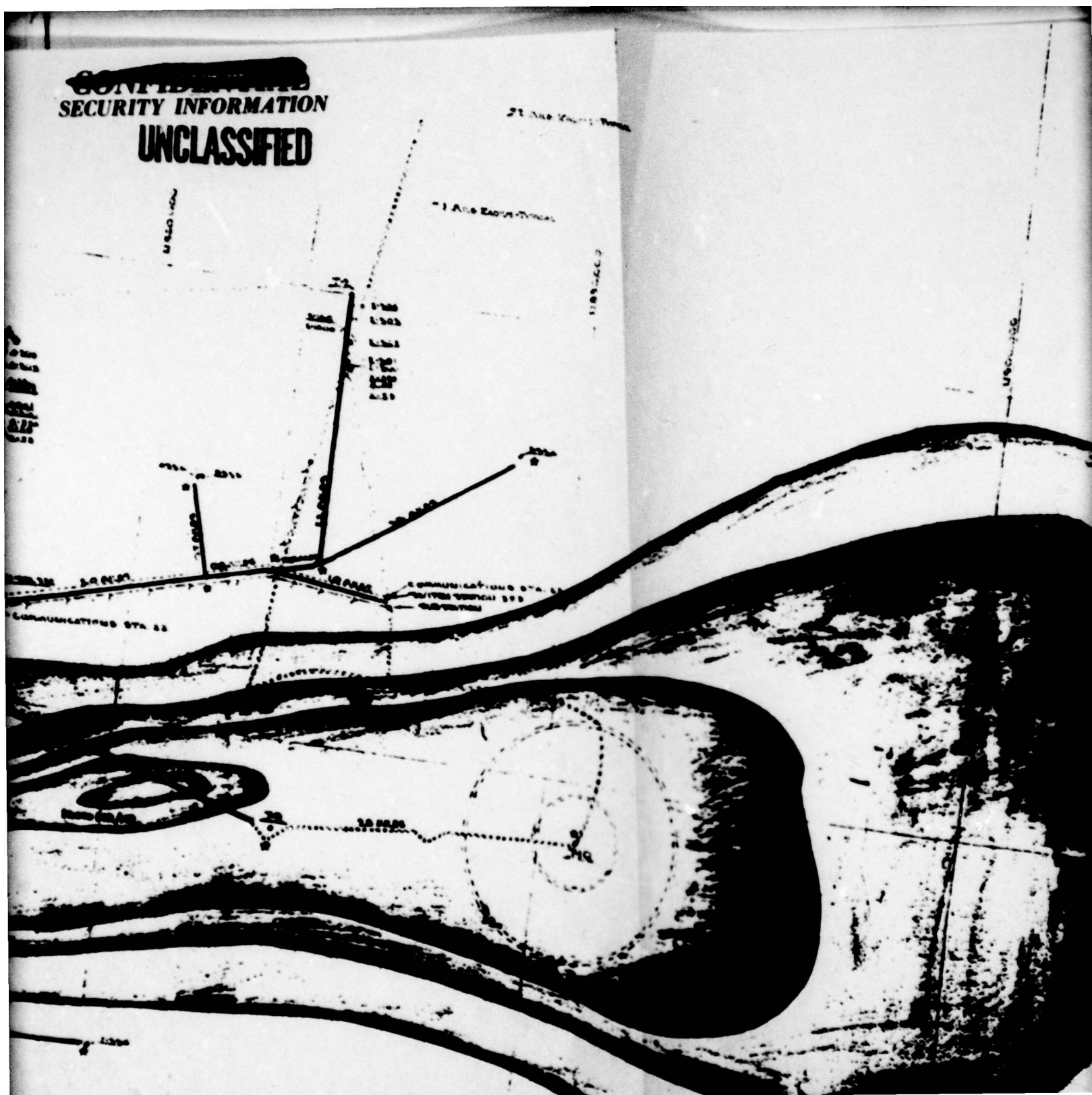


RAD SAFE GROUP

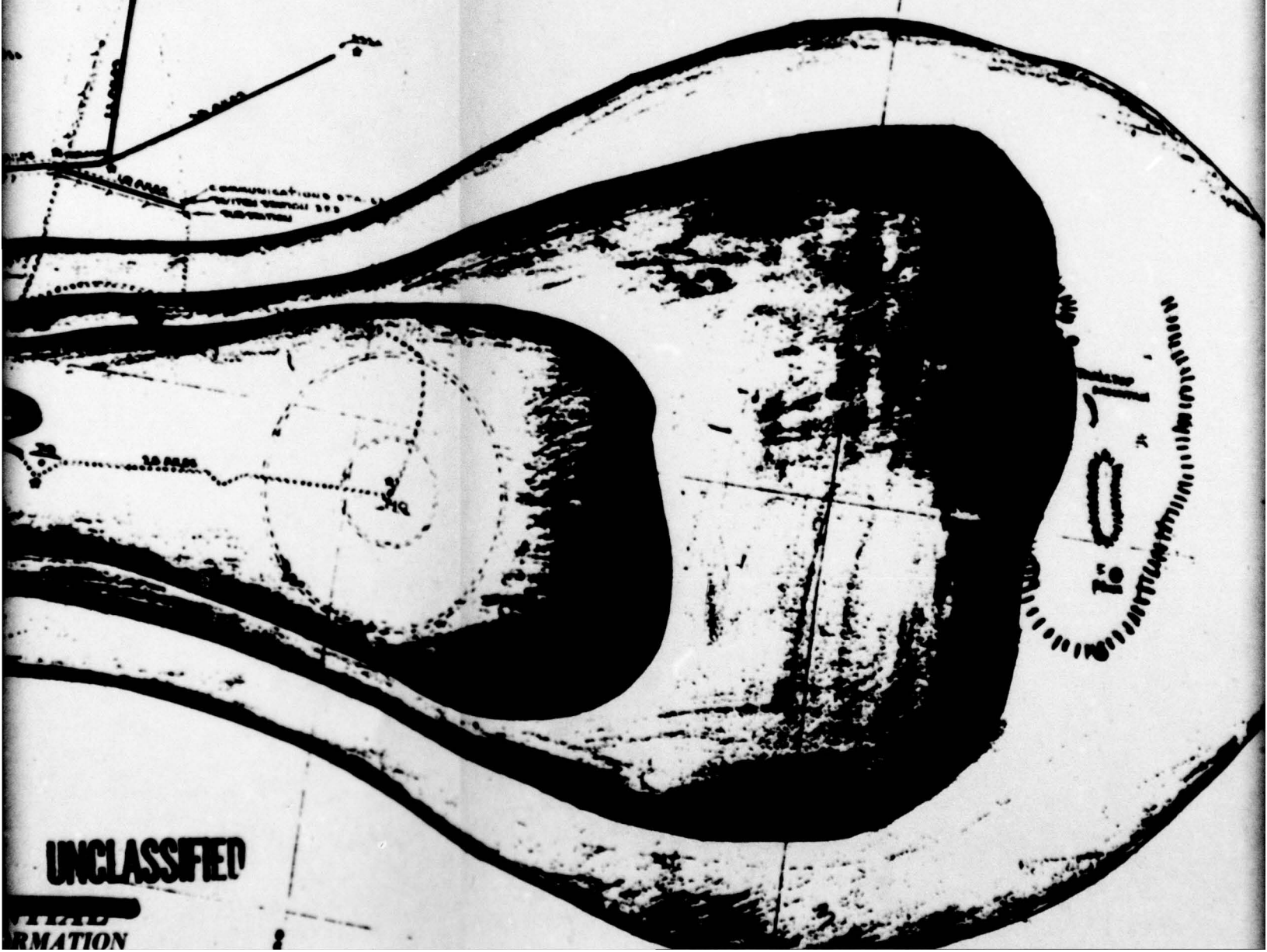
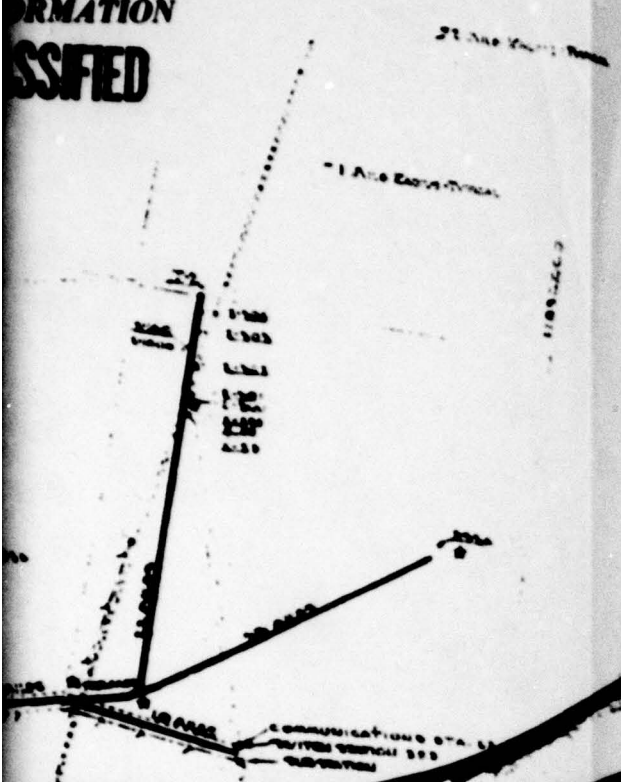
MAP PREPARED BY OFF-SITE RAD SAFE OPERATIONS
 THE HIGHER LINES BEYOND 3 MILE RADIUS OF ZERO POINT WERE
 EXTRAPOLATED FROM 0-1 DAY DATA USING T-4 DATA FACTOR
 THE CONTRIBUTION FROM T-4 AREA WAS EXCLUDED
 MADE H.M. LULLMAN

ISOINTENSITY LINES INDICATE INTENSITY AT H+1 HOUR,
 GEORGE SHOT TUMBLER-SHAFER SERIES, 1 JUNE 1962.

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ANNEX V - DAMAGE EFFECTS - EXERCISE DESERT ROCK IV H

SHOT NUMBER EIGHT

Noticeable and different blast damage effects connected with Shot Number Eight include:

1. The blowing of a sheep's body through the wire mesh of a steel frame cage located 550 yards from ground zero, and the blasting of the sheep's intestines from the body.
2. The complete collapse of sidewalls and filling of practically all foxholes within a 550 yard radius from ground zero.
3. The blasting of the bed from a 2 1/2 ton truck and throwing it fifty yards away while leaving the chassis within two feet of its original location, 550 yards from ground zero.
4. The very noticeable pulverizing and loosening of soil to a depth of four inches within a radius of 600 yards from ground zero.

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EXERCISE DESERT HOCK IV
EQUIPMENT DAMAGE EFFECTS

Approx Height of Burst - 300'
Approx KT Yield - 17

1 June 1952 0455 Hours

Weather - Clear, Cool
Wind - 6 Knots, 180°

Items of Display	550 Yards	900 Yards	1700 Yards
Truck 2 1/2 Ton	Bed of Truck torn from chassis and thrown 50 yds away from original position. Chassis moved approximately 2' from original position.		
Truck 1 1/4 Ton		Vehicle scorched but otherwise appeared undamaged from blast.	
105-mm How (Self-propelled)	Pushed approximately 5' from original position. Gun not visibly damaged.		
Amphibian Tractor	Rollled over lengthwise & dug in ground at end opposite the blast.		
Tank, Med	Pushed approx 2' sideways away from blast. No apparent physical damage. Some scorching on exterior surface.		
81-mm Mortar (Dug-in)	Barrel scorched. Emplacement caved in & half filled by dirt & sandbags. Weapon controls buried in dirt.	No visible damage to weapon.	
Flame Thrower .30 Cal. Lt MG	Thrown approx 70 yds from original position. Not operable. Appeared to be undamaged. Foxhole half filled by caved in sidewalls.	Blasted apart; some visible scorching effect. No visible damage to weapon, sandbags.	No visible damage to weapon. Sandbags slightly scorched.
Cloth Samples White cotton. Khaki. OD Herringbone Twill	All burned and blasted away. One board broken off & lost by blast.	All samples burned and blasted off boards.	Khaki scorched. White cotton heavily scorched. OD cotton twill burned & blasted off of board.

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Items of Display	550 Yards	900 Yards	1700 Yards
Open Fox-hole	Completely collapsed and filled by dirt and sandbags.	Walls partially collapsed from ground shocks. Sandbags burst and scorched on forward edge.	Slight scorching of sandbags. No other visible damage.
Covered Foxhole	Walls collapsed, roof broken & sagging below ground surface, foxhole 2/3 filled w/dirt from collapsed walls & sandbags.	Walls partially collapsed by earth shocks, cover of foxhole intact. Insulation on blue field telephone wire running into foxhole buried & peeled in spots.	No apparent damage.
Sheep (On ground surface)	Sheep blown through wire of pen & approx 25 yds beyond cage by blast. Intestinal organs blown out. Steel frame pen completely collapsed and 20 yds from original position.	Sheep badly scorched and shocked from blast. Insulation on field telephone wire used to help anchor cage burned & blasted off. Cage still intact.	Wool slightly scorched. No other apparent physical injury. Front of wooden frame of pen lightly charred from thermal radiation.
Sheep (In foxhole 4' deep)	Almost completely covered w/dirt, sandbag on back, severely shocked, some scorching effect visible. (See Inclosure)	Sheep up to knees in dirt from partially collapsed sidewalls. One eye damaged Sandbags burst and scorched but still in place.	No apparent injury.
SCR 300 Walky-Talky in foxhole		Except for aerial, radio was completely covered by dirt from collapsed walls. Some sandbags knocked off into foxhole.	
Vegetation	General covering of sage, w/some grease wood, almost completely removed by blast effect. Soil in this area was noticeably loosened about 4" deep.	Shown some scorching effect but damaged mostly from blast. General uprooting and stripping of leaves from branches on plants.	Very light blast & scorching effect.

SHOT NUMBER EIGHT

GAMMA RADIATION INTENSITY TEST

1. The object of this experiment was to record on film badges the gamma radiation from an atomic detonation, the radiation dose a soldier might have received in protected (foxhole), and unprotected positions at 500, 900, and 1700 yards from ground zero.

2. The film badges were placed in National Bureau of Standards film badge holders in order to more accurately record the very high intensity of the gamma radiation of the 500 and 900 yard positions. Data for this test was taken from the scheduled eighth nuclear detonation of Spring 1952 testing program at the Nevada Proving Grounds.

500-Yard Position

<u>Position</u>	<u>Dose in Roentgens</u>
1. Machine Gun emplacement above ground	6300
2. Machine Gun emplacement below ground	2200
3. Inside tank in driver's seat (Note all hatch covers on tank open)	6300
4. Animal pen above ground	6300
5. Covered observation post	lost
6. Dummy in driver's seat of truck	6300

900-Yard Position

7. Mortar emplacement above ground	4260
8. Mortar emplacement below ground	140
9. Driver's seat of 1/4 ton truck	2800
10. Animal pen above ground	4620
11. Covered observation post	220
12. On dummy above ground	3650

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1700-Yard Position

<u>Position</u>	<u>Dose in Roentgens</u>
13. Mortar emplacement above ground	95
14. Mortar emplacement below ground	1.8
15. Driver's seat 3/4 ton truck	85
16. Animal pen above ground	100
17. Covered observation post	10
18. On dummy above ground	95

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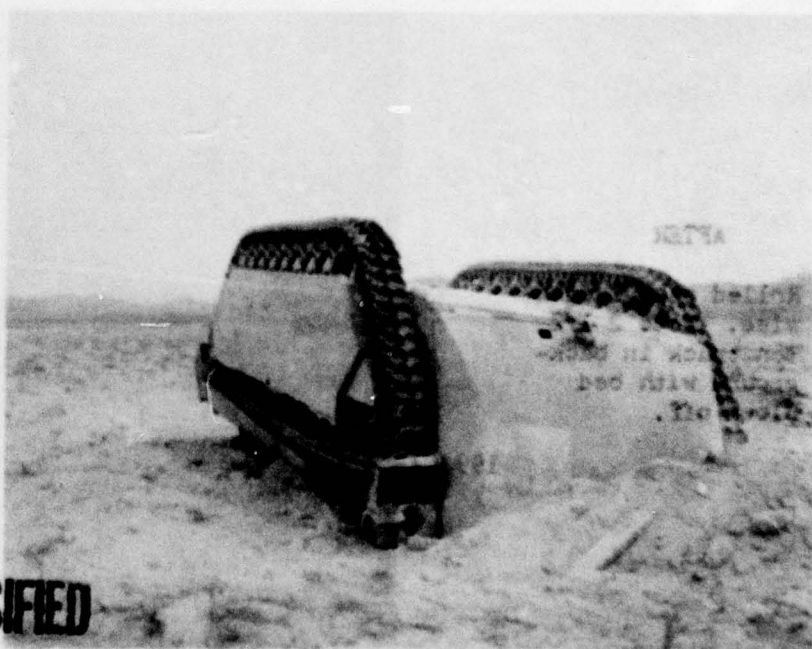
BEFORE

LVT-500 yards from
ground zero. Side
to detonation. 300'
tower that held
device may be seen
in background.

AFTER

End away from blast
dug into ground.

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BEFORE

LVT - Side toward
detonation 500
yards from ground
zero.

AFTER

Rolled over length-
wise. Note 2 1/2
Ton truck in back-
ground with bed
blown off.

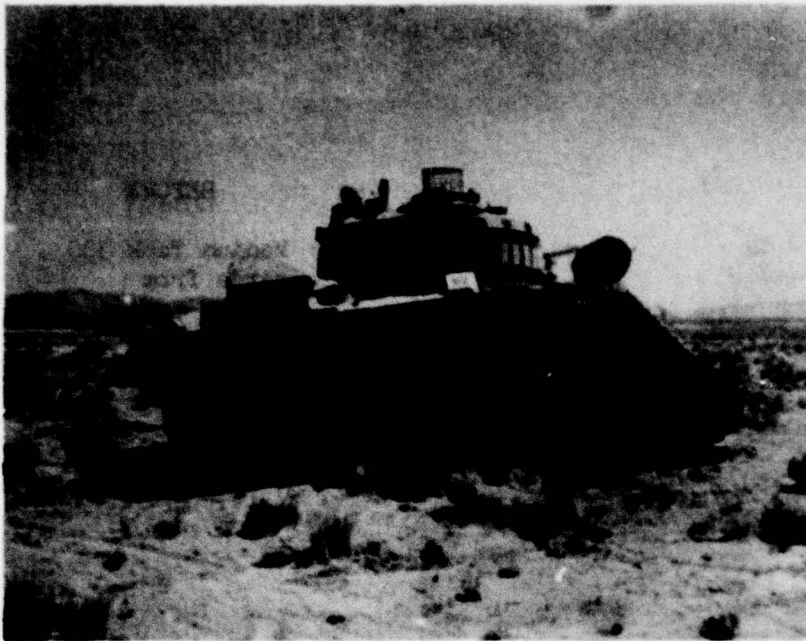
199



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BEFORE

Medium Tank. Side
toward detonation
500 yards from
ground zero.

AFTER

Note hole where tank
slid sideways.

200



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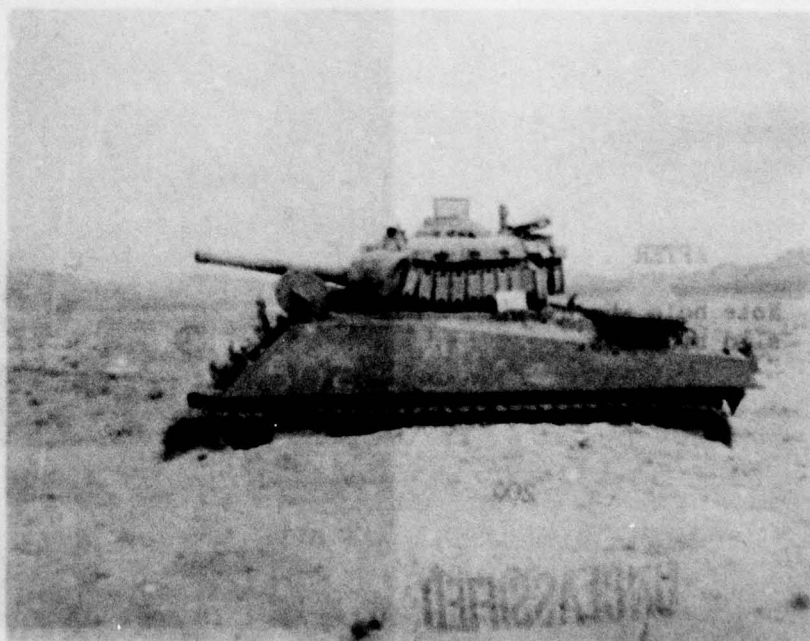
BEFORE

Medium Tank 500
yards from
ground zero.

AFTER

Pushed approximate-
ly 5' from original
position. Gun not
damaged.

201

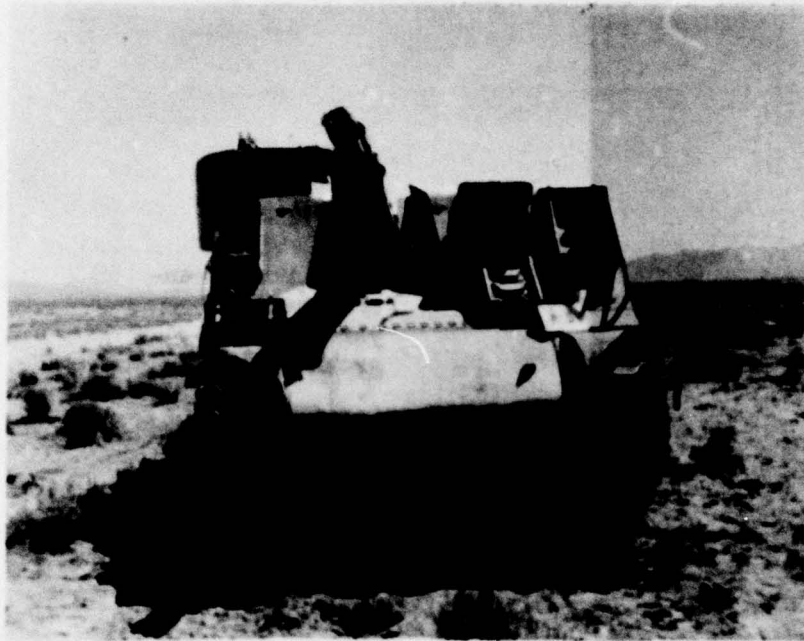


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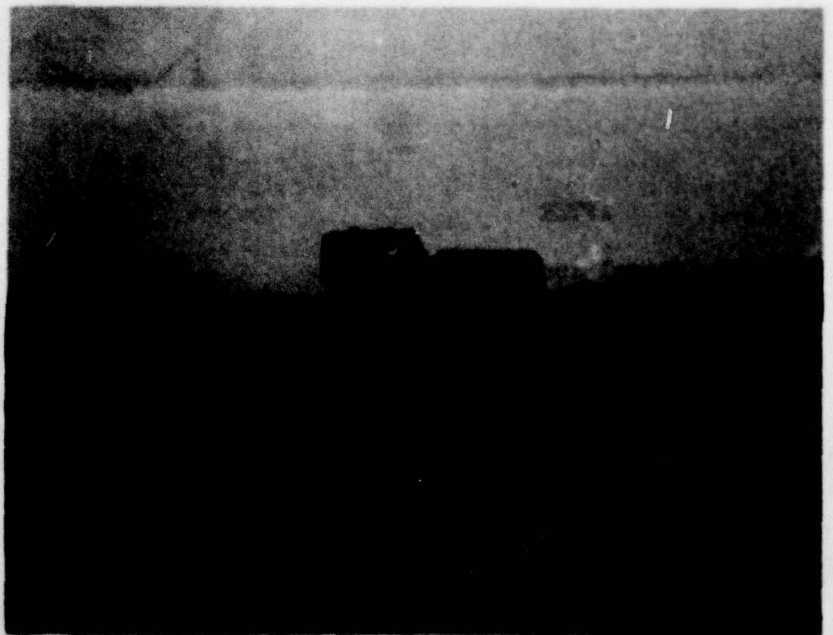
BEFORE

M-7 Self-propelled
Howitzer 500 yards
from ground zero.

AFTER

Weapon slid backward
approximately 5'.

202



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BEFORE

81-mm Mortar entrenched 500 yards from ground zero.



AFTER

Barrel scorched, weapon control buried in dirt, emplacement caved in.

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BEFORE

Dummy entrenched
500 yards from
ground zero.



AFTER

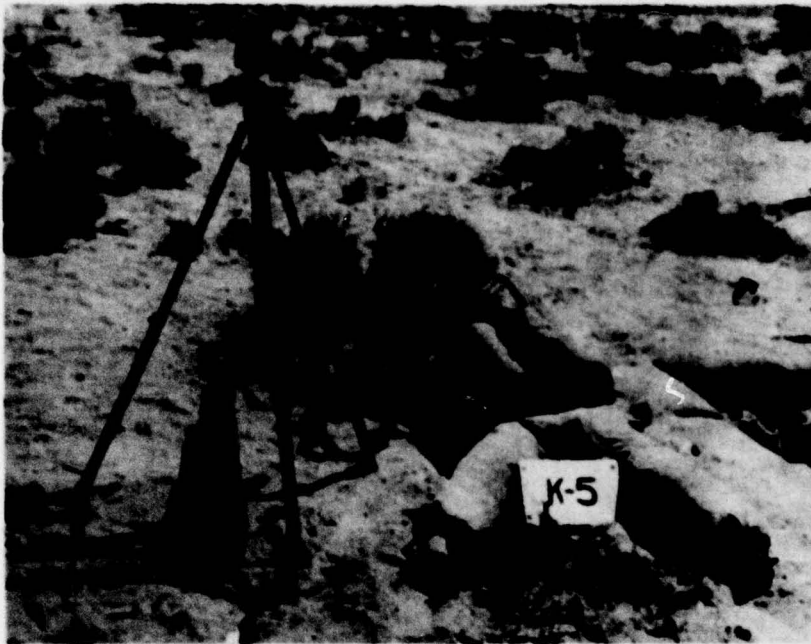
Foxhole collapsed
and contents
buried.

204

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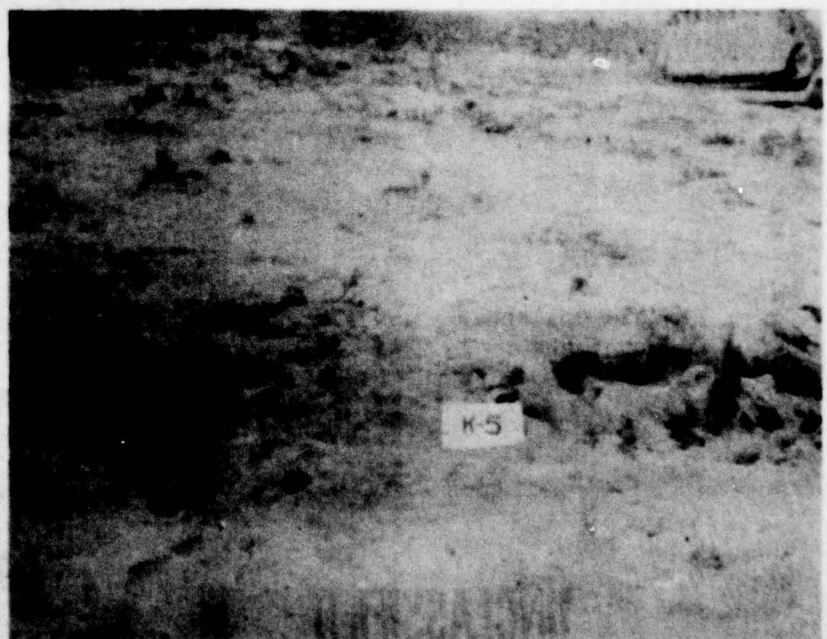
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BEFORE

Aiming Circle,
Dummy and Flame-
thrower 500 yards
from ground zero.

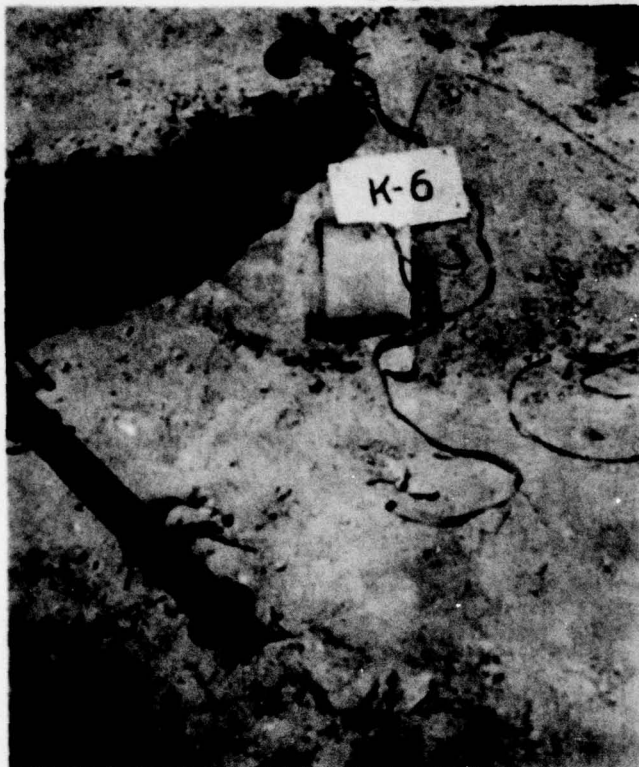


AFTER

Note pulverizing of soil.
A condition generally
true within a radius
of 500 yards from
ground zero.

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BEFORE

Observation Post
with telephone
and Bazooka 500
yards from
ground zero.

AFTER

Cover collapsed.
Bazooka operable.



206

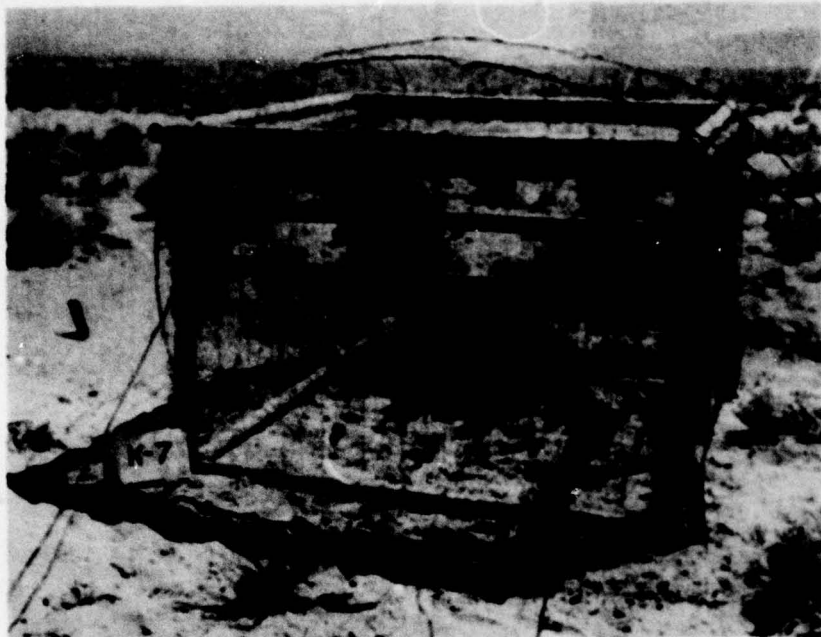
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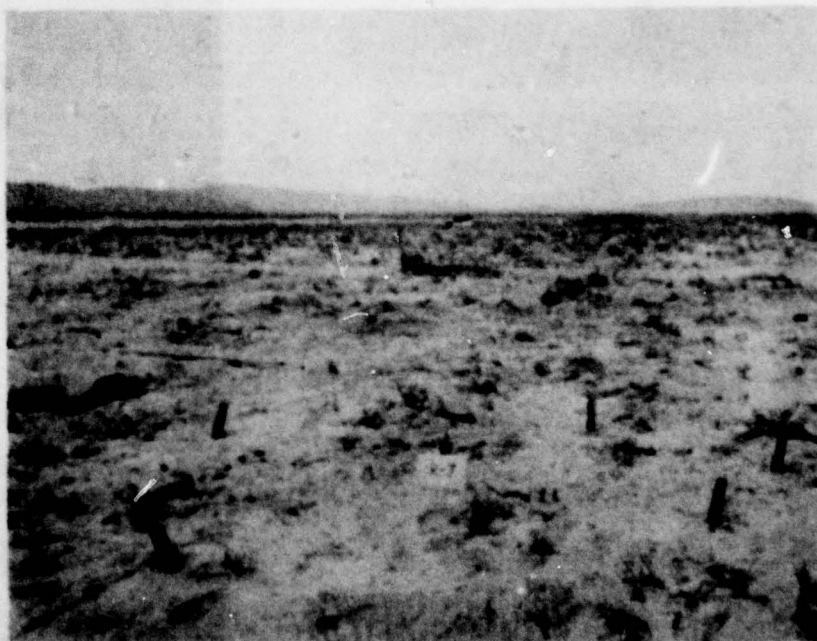
BEFORE

Sheep Pen 500
yards from
ground zero.

AFTER

Collapsed sheep pen
blown 50 yards from
original position.
Sheep killed and
blown 50 yards be-
yond cage.

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BEFORE

.30 Cal. Machine
Gun Lt 500 yards
from ground zero.

AFTER

Foxhole caved in.
MG operable.



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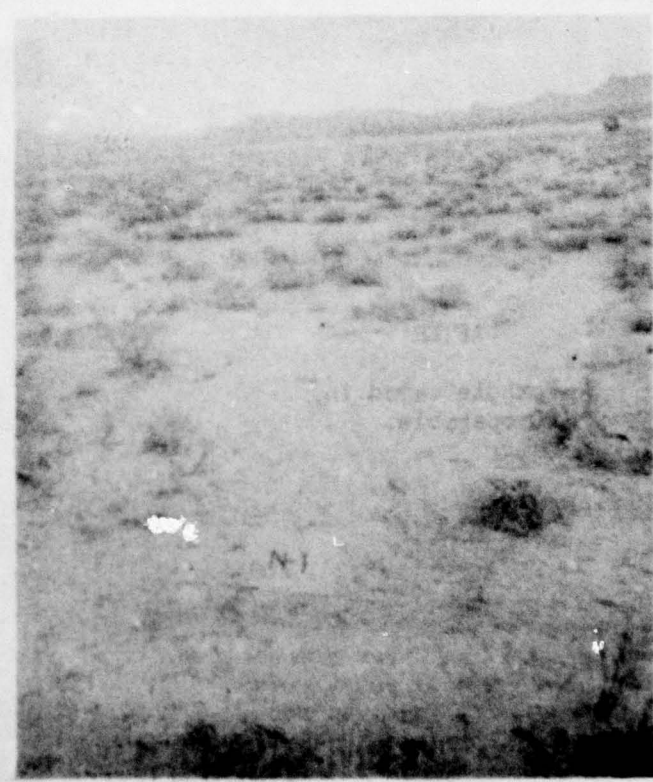
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BEFORE

Dummy standing
900 yards from
ground zero.
Tower for Shot
No. 8 in back-
ground.

**AFTER
AWOL**



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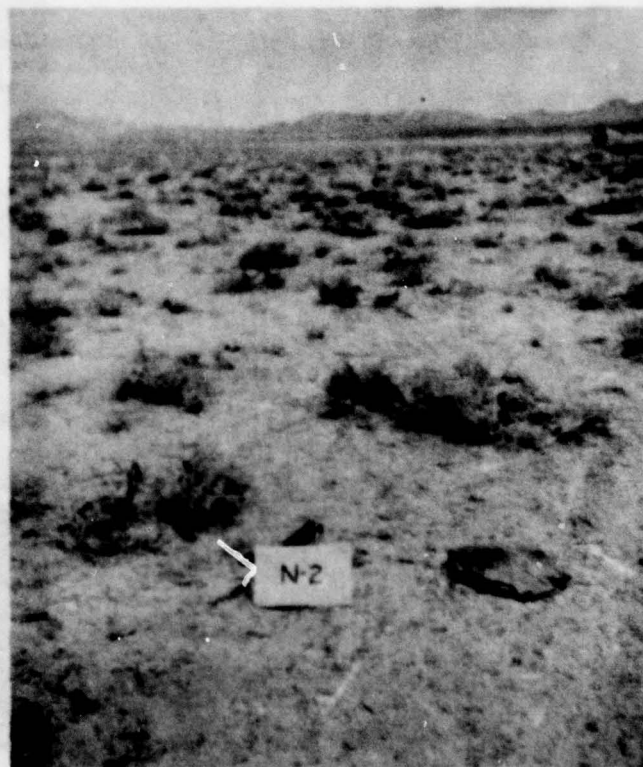
BEFORE

Dummy kneeling
900 yards from
ground zero.

AFTER
AWOL

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BEFORE

Dummy standing
900 yards from
ground zero.

AFTER

Burned and blasted
apart.

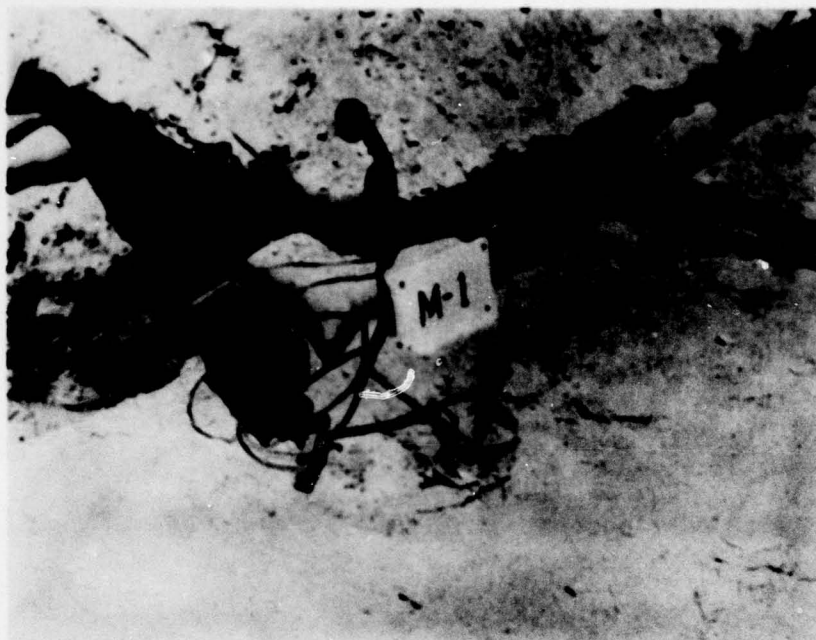


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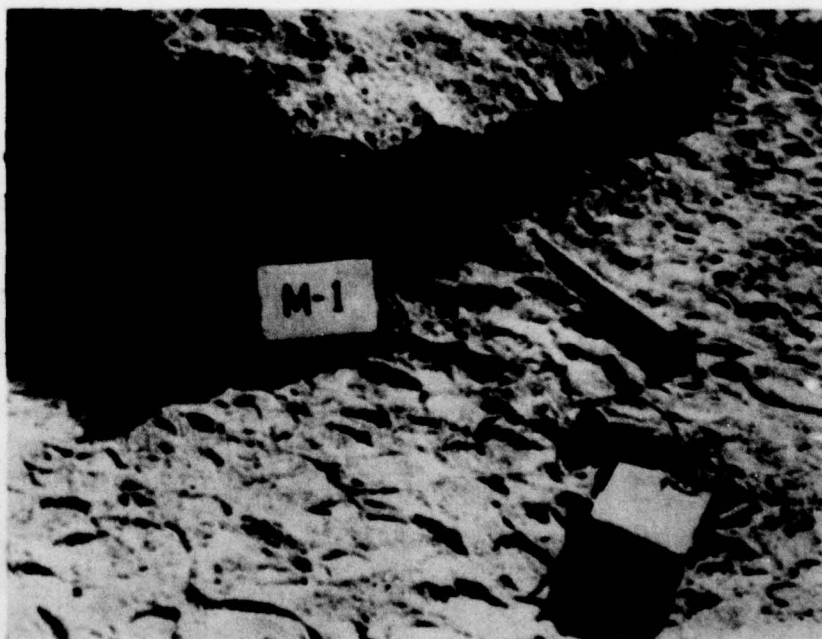
BEFORE

OP at 900 yards
from ground zero.

AFTER

Cover and walls un-
damaged. Weapon
and telephone
appeared to be
operable.

212



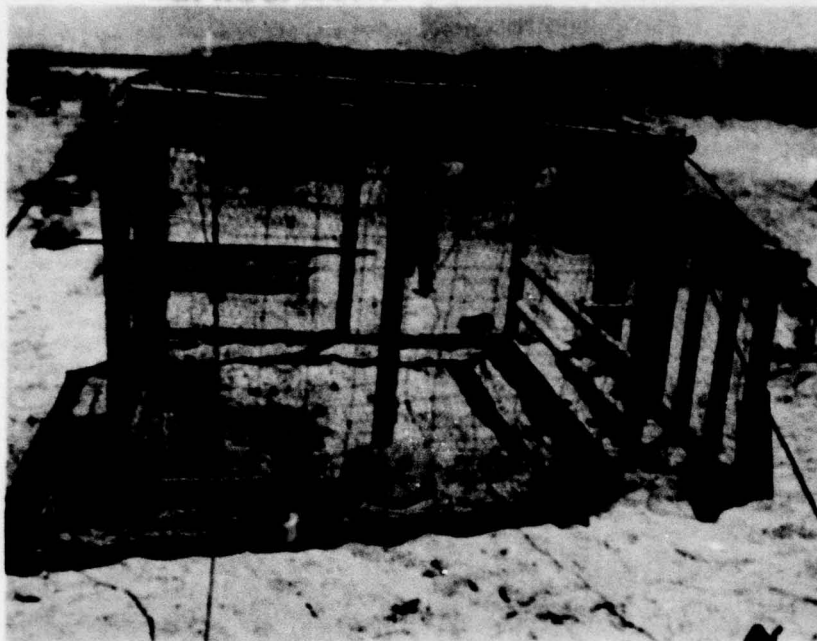
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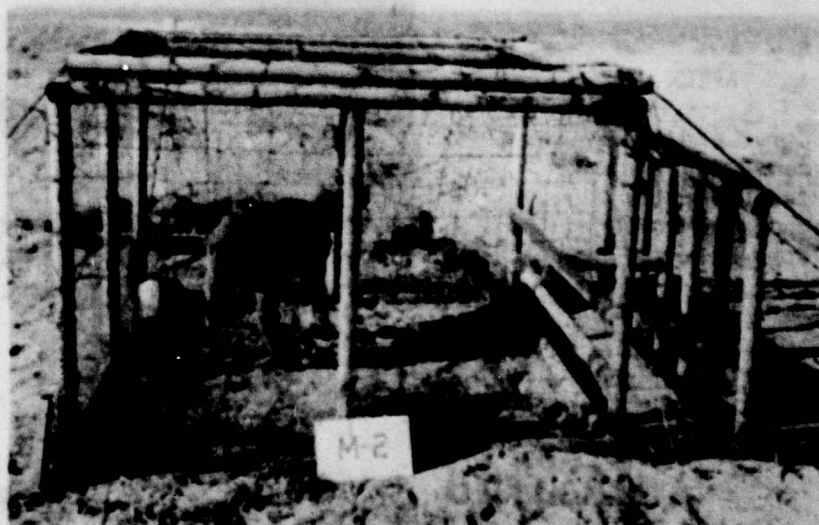
BEFORE

Sheep Cage 900
yards from
ground zero.

AFTER

Sheep still stand-
ing, badly scorched
on side next to
blast.

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BEFORE

.30 Cal. Lt MG.
Cloth Samples
900 yards from
ground zero.

AFTER

Weapon operable,
cloth samples
burned and blast-
ed off board.
Note protection
of cloth on
board.

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BEFORE

Dummy with flame-
thrower 900 yards
from ground zero.

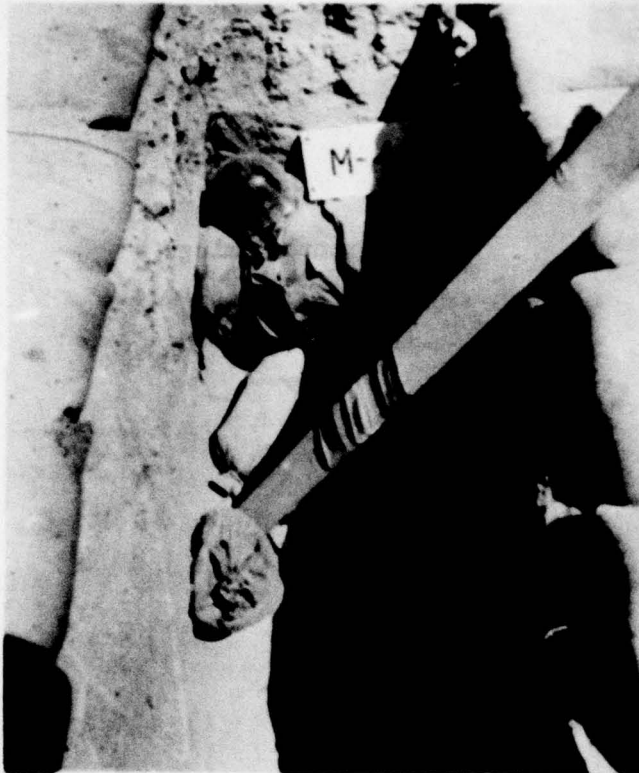
AFTER

Dummy torn apart.
Flamethrower
blasted apart.



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BEFORE

Dummy in foxhole
900 yards from
ground zero.

AFTER

Partly covered
with dirt from
collapsed side-
wall.



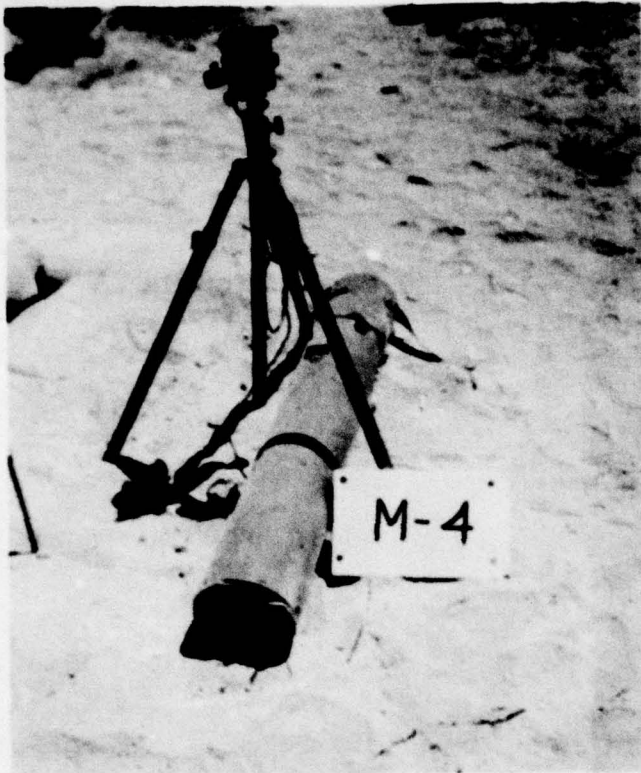
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BEFORE

French Aiming
Circle 900
yards from
ground zero.

AFTER

Instrument not
operable.



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BEFORE

.30 Cal. Hvy MG.
900 yards from
ground zero.

AFTER

Slight scorch.
Weapon operable.

218



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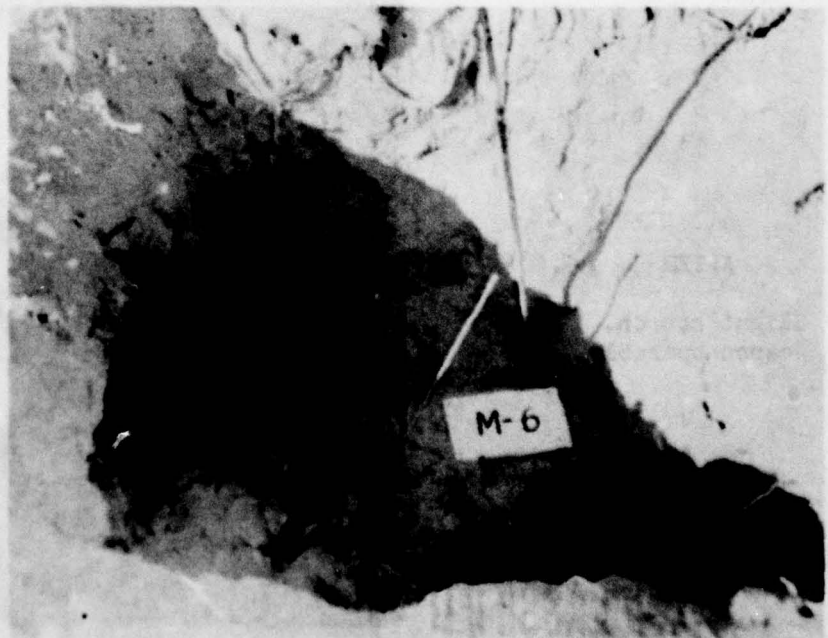


BEFORE

Hand generator
and Radio Set
900 yards from
ground zero.

AFTER

Covered with dirt
from collapsed
sidewalls.



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BEFORE

Two .30 Cal. MG
Lt 1700 yards
from ground zero.

AFTER

Sandbags scorched.
Guns operable.

220



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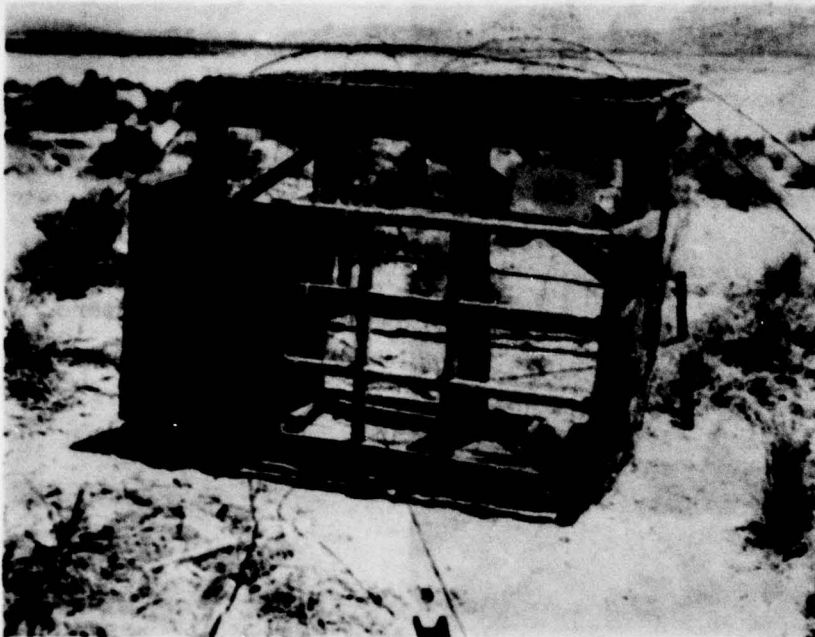
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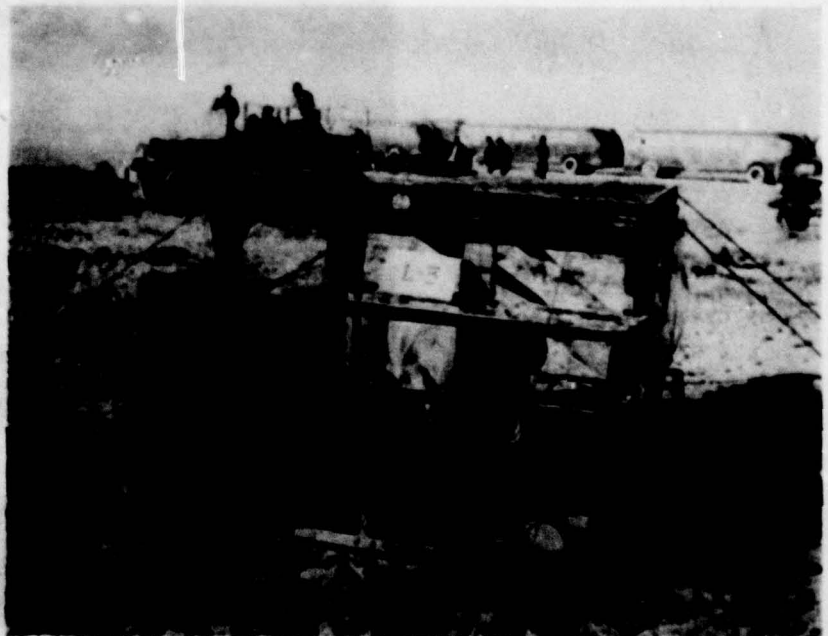
BEFORE

Sheep Pen 1700
yards from
ground zero.

AFTER

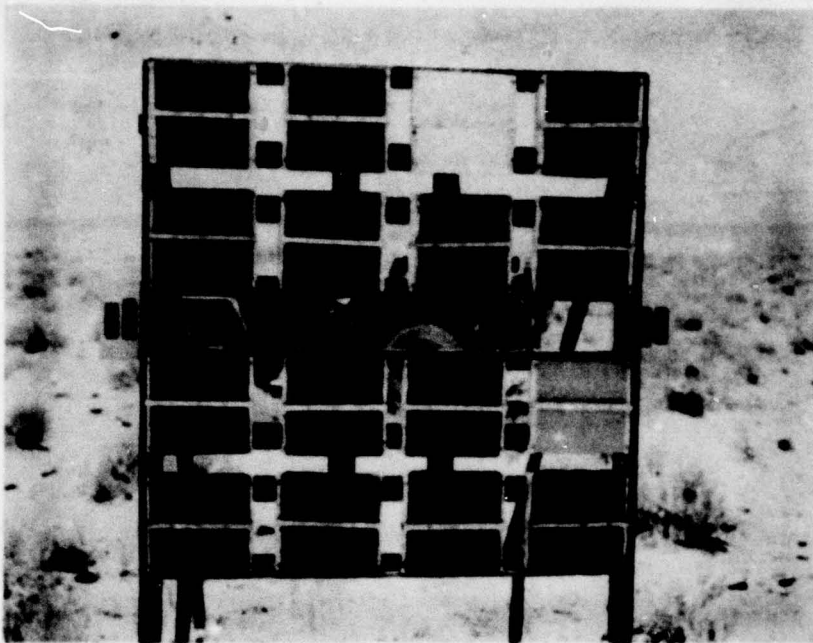
Sheep scorched.

221



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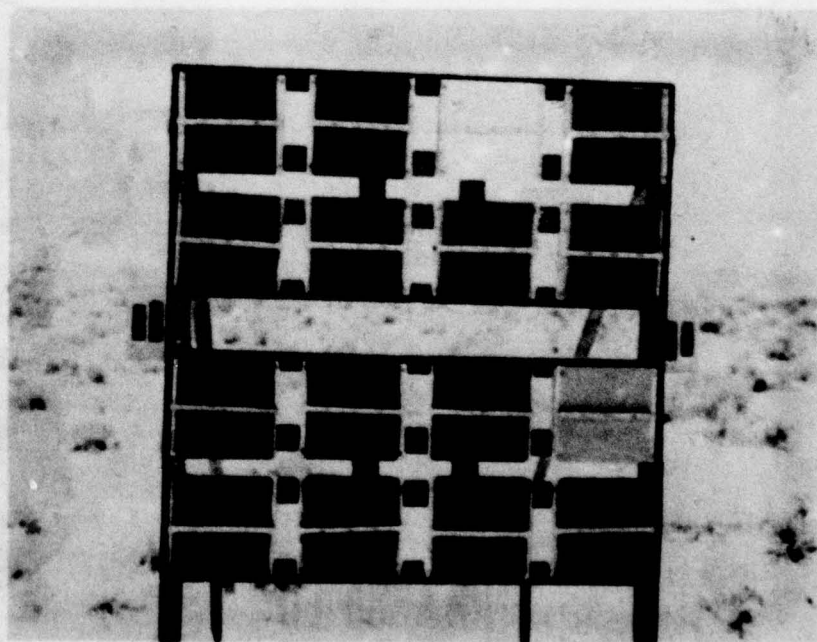
BEFORE

Cloth Sample Board
2800 yards from
ground zero.

AFTER

Some cloth scorched.

237



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PC 0652 4773

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BEFORE

Field Jacket 2800
yards from ground
zero.

AFTER

Slightly scorched.

236



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#065247

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BEFORE

Khaki Shirt 2800
yards from
ground zero.

AFTER

Slightly scorched.

234



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BEFORE

Jacket, Wool, CD
2800 yards from
ground zero.

AFTER

Severely scorched.



235

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BEFORE

Parka 2800 yards
from ground zero.

AFTER

Outer shell severely scorched.

232



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BEFORE

Fatigue Jacket
2800 yards from
ground zero.

AFTER

Slightly scorched.

233



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BEFORE

Lightweight wool
OD Jacket and
Undershirt 1800
yards from
ground zero.

AFTER

Jacket burned
severely. Under-
shirt only slight-
ly scorched.

231



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BEFORE

Fatigue Jacket and
Tee Shirt 1800
yards from ground
zero.

AFTER

Jacket burned.
Tee Shirt severely
scorched.

230



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BEFORE

Khaki Shirt and
Cotton Tee Shirt
1800 yards from
ground zero.

AFTER

Khaki Shirt burned
completely. Tee
shirt only scorched.

229



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BEFORE

Field Jacket 1600
yards from ground
zero.

AFTER

Outer shell burn-
ed. Inner liner
scorched.

228



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BEFORE

Parka with hood
1800 yards from
ground zero.

AFTER

Outer shell burned
severely. Inner
liner severely
scorched.

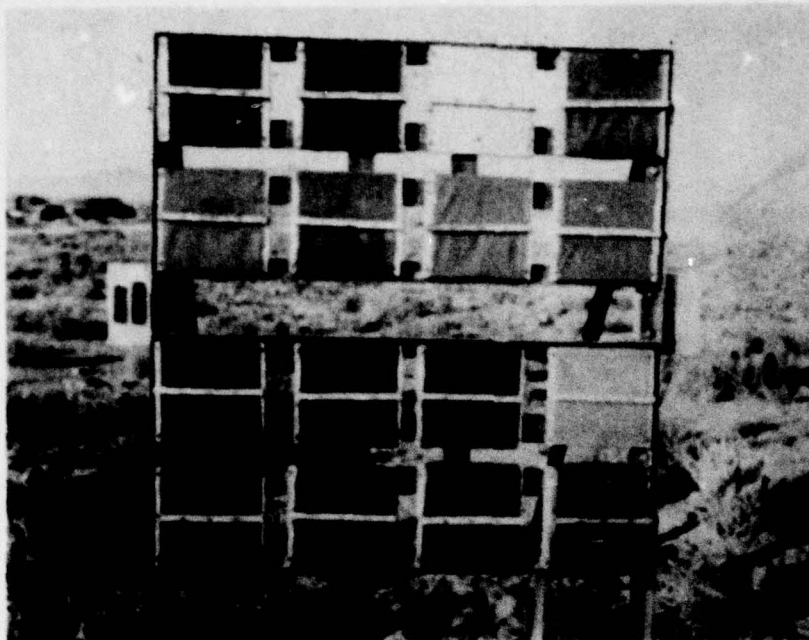
227



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BEFORE

Cloth Sample Board
1800 yards from
ground zero.

AFTER

All samples, ex-
cept aluminized,
badly burned.

226



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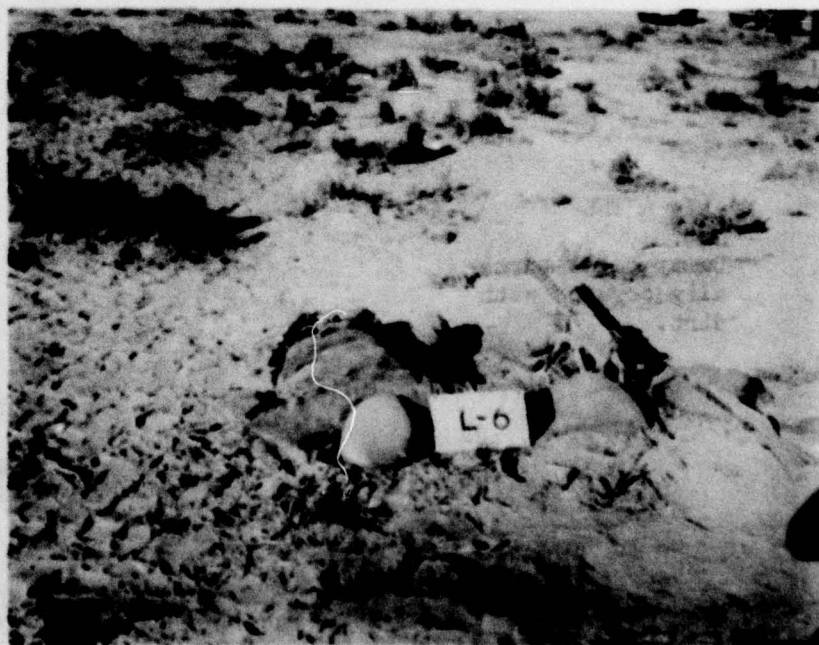


BEFORE

Dummy and Gun
1700 yards from
ground zero.

AFTER

Dummy partially
burned and blown
completely
around.



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BEFORE

Dummy above and
below ground.
1700 yards from
ground zero.

AFTER

Dummy below parti-
ally covered with
dirt.

224



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BEFORE

Field Phone - Bag
1700 yards from
ground zero.

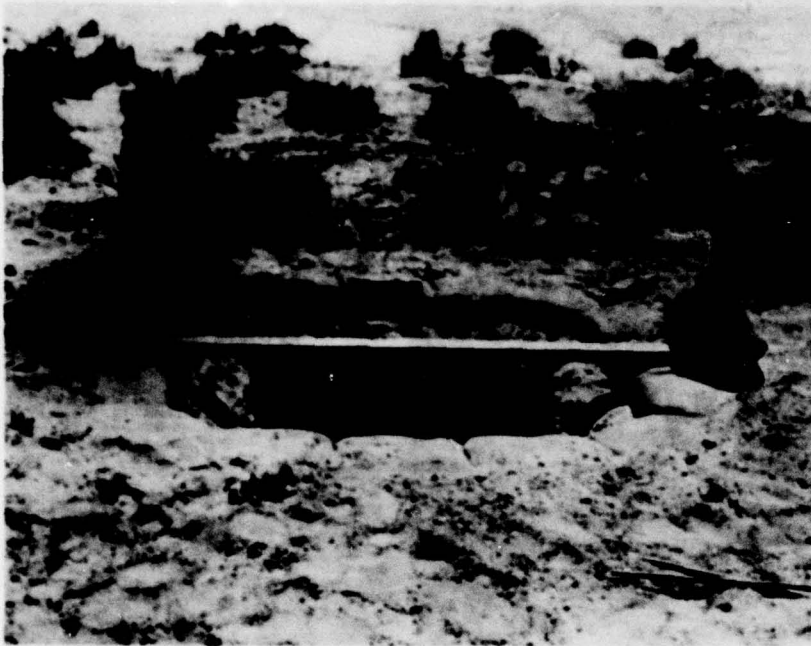
AFTER

Phone blasted
loose. Bag blown
away.

223



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BEFORE

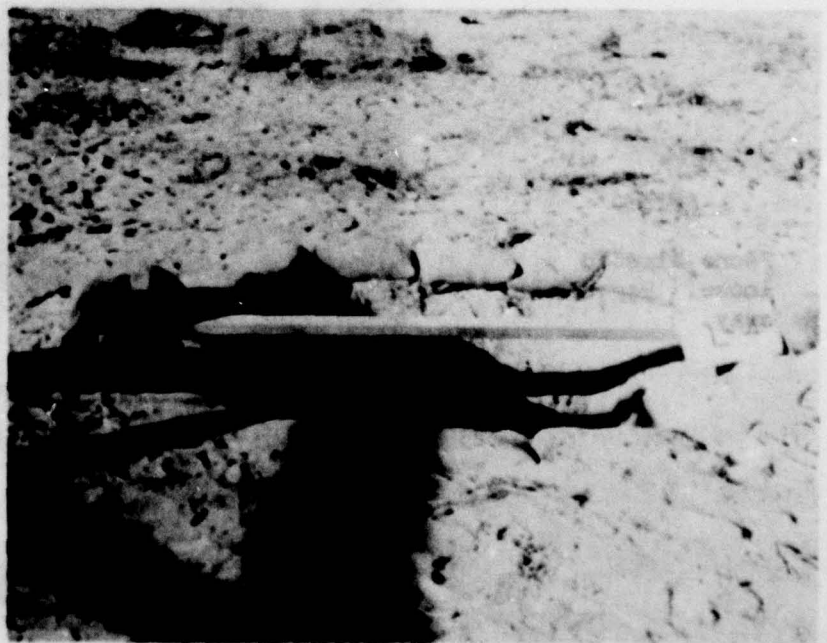
Two-man foxhole
1700 yards from
ground zero.

AFTER

Sandbags scorched.

222

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